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AMERICAN CONGRESS OF PHYSICAL MEDICINE AND REHABILITATION

AMERICAN ACADEMY OF PHYSICAL MEDICINE AND REHABILITATION



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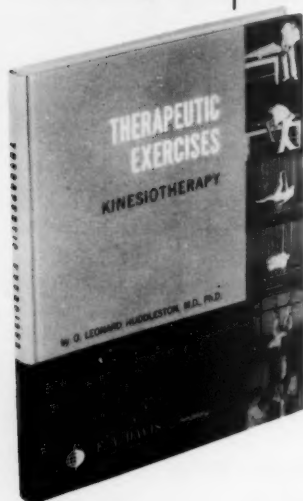
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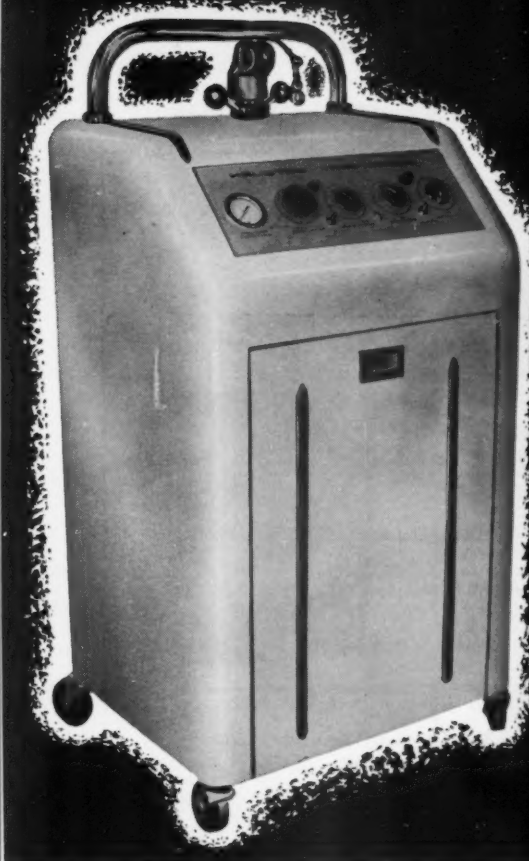
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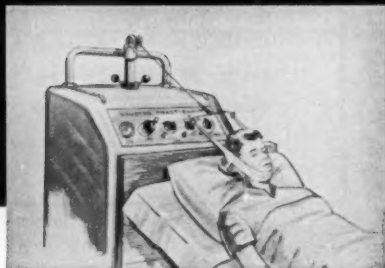
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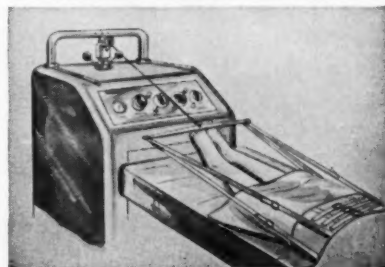
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HELEN M. WALLACE, M.D., U.S. Children's Bureau, Department of Health, Education and Welfare, Washington, D.C.

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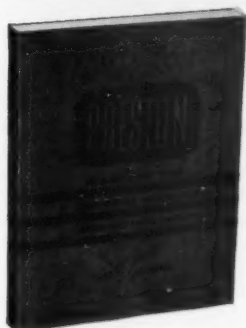
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And the reason I'm not cross is that I've just finished signing 725 letters which went out to M.D.'s and Hospital Administrators all over the country. Each of these men had requested information on Physical Medicine, primarily on Ultrasonics, at the AMA convention in New York. We made up a regular letter and had it done the necessary 725 times. So, this morning I *have* got a sore paw.

It should be most pleasing to all of us that every day, month and year thousands of people in the medical arts are becoming converts to something you and I have known for a long time . . . the conviction that Physical Medicine needs not take a back seat to any specialty in the field of medicine. People are slowly but surely becoming aware that our field is not some sort of step-child to other phases of medicine, but rather is an increasingly important specialty.

What made the inquiries from the AMA convention doubly pleasing to many of us, however, was the fact that there

were at least 20 notes from Hospital Administrators who wanted to check on what was required in setting up a Physical Medicine Department within their institutions. I believe that it is no secret that most Physiatrists have long believed that most hospitals should have such a department. It's becoming obvious every day that the belief is being held by more and more people who are not as intimately aware of the field . . . and about time, too.

You may or may not remember that during some of the preceding months I have discussed leasing of medical equipment on these pages. While we have leased a great many units to various Physiatrists during the past year, we have just received an order to furnish a *complete* set of leased equipment to one of the largest PT installations in the country. About the only reason I bring this up (in addition to blowing our own horn, of course) is to remind you that leasing of medical equipment is available to you. If you'd like some details on the procedure, just drop me a line.

In closing, I'd like to pass along a funny little item I ran across the other day. It's a definition, as follows; "Humility — the art of seeming ashamed while you're telling people how wonderful you are!"


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The Clinical Approach at the Woodrow Wilson Rehabilitation Center, Fishersville, Virginia, features the Clinical Team—the Orthopedist, the Prosthetic Technician (a HANGER Certified Prosthetist), the Physical Therapist, and the Occupational Therapist (for arm amputees only).

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desirable. Then a course of rehabilitation is prescribed by the Orthopedist, including the Physical (and Occupational for arm amputees) Therapy necessary, the type of Prosthesis to be worn, and other special treatment or training required.

Immediately the patient's treatment by the Center begins according to the Prescription. The patient receives pre-prosthetic therapy in which the stump is conditioned to provide the most efficient use of the Prosthesis. He is supervised and treated in baths, heat, exercise, etc., by therapists and nurses specially-trained for this work.

When the patient actually begins to wear the prosthesis, the Clinical Team again works closely together in the rehabilitation program. The Prosthesis itself has been fabricated according to the measurements and specifications taken by the Prosthetist member of the Clinical Team. Careful attention is now given to fitting adjustments, continued therapy and training exercises, such as walking, sitting, steps, etc. Unusual problems are cause for a complete review and possible change of prescription. For arm amputees, Occupational Therapy now becomes

important, and the amputee spends part of each day learning to use the Prosthesis and to live an independent life. Trained Therapists and nurses supervise the teaching of dexterity and manipula-



tion through blocks, games, doorknobs, faucets, tools, etc.

Most patients are ready for discharge in about six weeks. Each must appear at the Clinic for a final Prosthetic Performance Check-out by the Clinical Team and Official release by the Orthopedist.

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can be corrected with therapy, or with special prosthesis fitting and construction; if not, is further surgery

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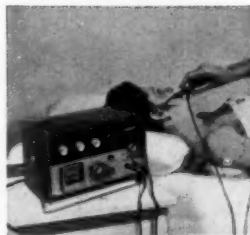
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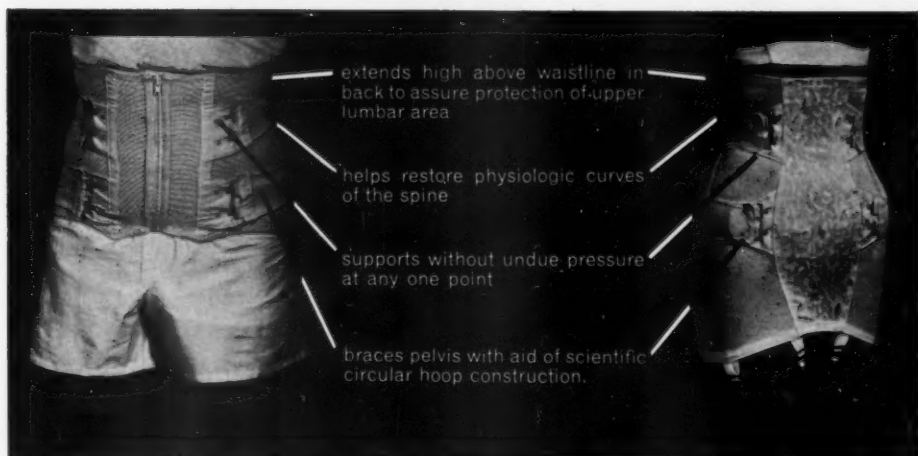
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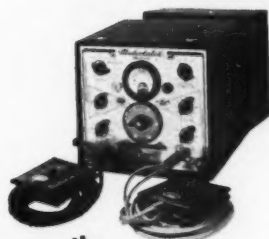
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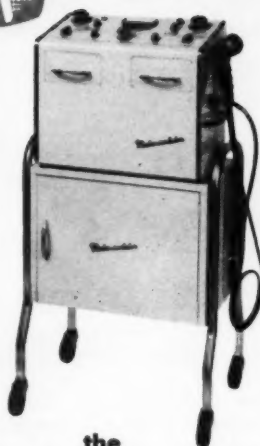
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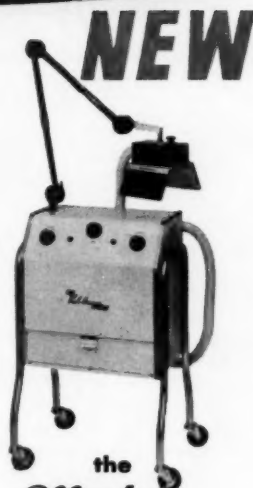
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Total Rehabilitation For The Physically Handicapped Child

Lack of coordination of programs for medical care and for the education of physically handicapped children is emphasized in the paper by Doctor Helen M. Wallace in this issue of the *Archives of Physical Medicine and Rehabilitation*. This study surveyed by questionnaire the educational programs available for "crippled" children in all cities with a population of 100,000 or more. "Crippled" or physically handicapped children were defined as children having some orthopedic, neuromuscular or neurologic disorder. Of the 106 cities contacted, 98 cities with a combined population of 42 million and a combined school enrollment of 6.8 million responded.

Ninety-one of the school systems had established criteria for the educational placement of handicapped children which varied from special residential schools or home instruction at one extreme to inclusion in the regular school program at the other. These special programs are expensive. They have been established for the purpose of improving the educational opportunities for the physically handicapped child. We should be concerned therefore with the adequacy of these programs to make the best possible placements of children and to provide the most appropriate education.

Although these special educational facilities were established for children with physical handicaps, a medical problem, there was medical participation in the establishment of criteria for educational placement in less than half of the communities. In all except 14 of the responding school systems there was opportunity for medical participation in review of the applications for special educational placement, but there was infrequent use of medical specialists: orthopedic surgeons - 19; pediatricians - 12; neurologists - 4. **NO PHYSIATRIST PARTICIPATED IN THE REVIEW OF APPLICATIONS FOR SPECIAL EDUCATIONAL PLACEMENT FOR PHYSICALLY HANDICAPPED CHILDREN.**

It appears that in more than one-half of the school systems studied, there was no established method of periodic review of children with physical handicaps severe enough to require special educational facilities or programs. Only 38 per cent of the communities indicated that this review was carried out by personally seeing the child and his family. In only one school system did a physiatrist participate in such a program of review.

Why are physiatrists not participating in special educational programs for physically handicapped children? Are they not interested? Are they not available? Why are not more vocational rehabilitation counselors participating in these educational programs? The stated goal of the physiatrist is the restoration of the patient with a physical handicap to the fullest physical, mental, social and vocational function of which he is capable. For the child this goal requires an adequate education. If the disability persists into adulthood this becomes a problem of concern to the vocational rehabilitation counselor. Cooperation by the counselor in the planning of educational programs for crippled children often would result in better preparation of those children for later

vocational training. Selection of the proper educational facilities certainly influences the eventual social and vocational status of the child as well as his intellectual attainments. Moreover, it is obvious that in many cases medical rehabilitation should be provided at the same time as the educational program. Every effort should be made to restore the physically handicapped child to full capacity. As his physical abilities increase his needs for special educational services will change. These adjustments will be made only if the child's condition is reviewed periodically by competent specialists.

Wallace reports that in one community approximately one-third of the physically handicapped children in special classes in public schools were inappropriately placed and could have been in regular classes. One-half of the physically handicapped children on home instruction could have returned to school. A large proportion of the children on home instruction had additional needs for services: medical, social service, vocational, and recreational. Planning for a total rehabilitation program was obviously lacking in such cases. Moreover, it would appear that in the absence of adequate rehabilitative planning and management the more expensive educational program was providing the less adequate rehabilitation.

This report should alert all physiatrists to a glaring deficiency in the programs for physically handicapped children. Adequate evaluation and continuing management of the physiatric problems of the handicapped child are necessary for successful rehabilitation. At the present time physiatrists are not participating in the educational programs for physically handicapped children. As a consequence the children frequently suffer from inadequate or improperly developed programs. The school systems suffer from excessive or unnecessary costs. The cooperation of physiatrists and vocational rehabilitation counselors with the special educational programs could lead to the development of total rehabilitation programs for physically handicapped children.

—Frederic J. Kottke, M.D.



School Services for Physically Handicapped Children in Urban Areas

Helen M. Wallace, M.D.
Washington, D. C.

● This paper reports on the findings of a survey conducted in 1958 to ascertain the status of school services for children with orthopedic, neuromuscular, or neurologic conditions in cities having a population of 100,000 or more. Wide variation exists in the range of services, policies and personnel provided. Suggestions are made so that these children may have the benefit of essential services in all urban areas.

Community services for "crippled" children have from their early beginnings included children with an orthopedic, neuromuscular or neurologic condition. Undoubtedly, one of the reasons for providing services for this group of children was the fact that these children usually have a visible condition or disability. Thus, a disability which easily could be seen and understood has usually meant that interest and concern were aroused, funds were appropriated or raised, and services were developed. The early and continuous provision for this group of children has been true of special educational services, care under official crippled children's programs, and care provided by a number of voluntary health agencies. In view of the long standing inclusion of children with orthopedic, neuromuscular, and neurologic conditions in educational programs, it seems timely to look at the provision for them by public school systems in the larger cities of our country.

Method of Study

During the winter of 1958 a questionnaire was sent to the health officers and superintendents of schools of each of the 106 cities of our country having a population of 100,000 or more according to the 1950 census. The questionnaire contained items regarding the types and numbers of handicapped children cared for in the public school system, the age of admission, the kinds of school facilities provided, the presence of established criteria for special educational placement and the agency responsible for their establishment, the method of review of applications for special educational placement, personnel engaged in such

review and frequency of review, organization of special education within the public school system, method of financing and costs of education of handicapped children, and the provision of transportation and attendant service during transportation of handicapped children to and from school.

This paper will summarize the information regarding children with orthopedic, neuromuscular and neurologic conditions provided on the questionnaires.

A previous paper¹ reported on the general information regarding all types of handicapped children provided on the questionnaires.

Study Findings

According to the 1950 census, the 106 cities had a combined total population of 44,311,716 or 29.4 per cent of the total of our country, and a combined school enrollment of children aged five through 17 years of 7,192,100 or 28.4 per cent of the total of our country. Ninety-eight of the 106 cities responded (92 per cent of the cities). These 98 respondent cities had a combined total population of 41,686,921 (94 per cent) and a combined school enrollment of children aged five through 17 years of 6,840,105 (95 per cent).^{*} All 98 respondent urban communities provide some school services for children who have an orthopedic, neuromuscular, or neurologic condition.

Age of Admission to School. It is becoming more accepted that some handicapped children may benefit from school attendance during the preschool period. Therefore the age of admission to school has considerable importance. Approxi-

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^{*}The cooperation of the Health Departments and Boards of Education in providing the information is gratefully acknowledged.

Table 1: Age of Admission of Physically Handicapped Children to Public School Systems

Age	No. of School Systems
6 years	35
5½ years	1
5 years	2
5½ years	2
5 years	23
4½ years	3
4½ years	4
4 years	6
3 years	17
Age not stated	5
Total	98

64.3%

30.6%

mately one-third of the public school systems admit physically handicapped* children to school before the age of five years; 64 per cent of the school systems do not admit these children before the usual age of school admission (table 1).

Types of Educational Placement Provided. Various types are shown in tables 2 and 3.

The Method of Educational Placement. Ninety-one of the 98 reporting public school systems (93 per cent) stated that they had criteria established for the educational placement of all types of handicapped children. Of the other seven school systems, one each had established criteria for cerebral palsy, for the blind, and for mental retardation; four did not answer this question.

In almost half of the public school systems, responsibility for establishing the criteria for educational placement has been assumed by the local government,

*The term "physically handicapped" as used hereafter in this report includes children with an orthopedic, neuromuscular, or neurologic condition.

Table 2: Types of Educational Placement (Other Than Regular Class) Provided by Public School Systems for Physically Handicapped Children

Type of Placement Provided	No. of School Systems
1. All Three Elements Provided	
Special day class, home instruction, hospital or convalescent home	16
Special day school, home instruction, hospital or convalescent home	15
Special day class, special day school, home instruction, hospital or convalescent home	5
Special residential school, home instruction, hospital or convalescent home	2
Total	38
2. Two Elements Provided	
Home instruction, hospital or convalescent home	9
Special day school, home instruction ..	8
Special day class, home instruction ...	7
Special day school, hospital or convalescent home	5
Special day class, hospital, or convalescent home	3
Total	32
3. One Element Provided	
Special day class alone	8
Special day school alone	3
Home instruction alone	3
Total	14
4. Miscellaneous*	8
5. Not reported	6
Total	98

*Composed of one each of: special day class, special residence school, hospital or convalescent home; special day class, special day school, special residential school, home instruction, hospital or convalescent home; special day class, special residential school, home instruction, hospital or convalescent home; special day class, special day school, home instruction; special day class, special day school; special day class, special day school, hospital or convalescent home; special residential school, hospital or convalescent home; special residential school.

Table 3: Number of Physically Handicapped Children Reported in Various Types of Placement

Type of Placement	No. of School Systems Reporting Service Available	No. of School Systems Reporting Data	No. of Children
Special day school	40	40	4,608
Regular class	98	28	3,807
Home instruction	68	65	3,774
Hospital and convalescent homes	60	58	3,557
Special day class	45	44	2,330
Special residential school	7	4	361
			18,487

Table 4: Agency Establishing Criteria for Educational Placement for All Types of Handicapped Children

By State Government — 28 (28.5%)	
State Department of Education	27
State Department of Education and Mental Health	1
By State and Local Government — 8	
State and Local Boards of Education	8
By Local Government — 46 (46.9%)	
Local Board of Education	25
Local Board of Education and Health Department	3
Miscellaneous	18
With medical participation — 7*	
Without medical participation — 11**	
Not stated	16
Total	98

*Consists of one each of the following: psychologist, teachers, medical examiners; school clinic; educators and medical specialists; local physician, psychologist, principal, teacher; nurse, social worker, school counselor; medical doctor, school psychologist, speech therapist, school medical supervisor; medical doctor, neurologist, therapist, teacher, Director of Special Education; psychologist, medical doctor, otologist, ophthalmologist.

**Consists of one each of the following: Consultant in Special Education and Professional Advisory Committee; School Board and Supervisors; Directors; individual evaluation and staff conference; Committee of Principals and Director of Special Education; Special Education Screening Committee; nurses, principals, supervisors and State Department of Education; Superintendent of Schools and Staff; Director of Schools and Classes for Public Health and supervisor of atypical classes; Case study and psychological examination, medical doctor; Superintendent, Director of Child Study, and speech therapist.

Table 5: Method of Review of All Applications for Educational Placement for All Types of Handicapped Children

Method of Review	Number
A (separately by Board of Education)	49
B (separately by Department of Health)	0
C (jointly by Education and Health Departments)	20
D (on recommendation of practicing physician only)	3
A, B, C, D	1
A & D	5
A & B	2
A & C	2
Not checked	3
E (miscellaneous*)	13
Total	98

*Consists of one each of: A plus recommendation by M.D., approved by city and state special education committee; psychological and/or medical examiner; D and E with Administration and Disposition Committee; M.D. recommends, health department; C for blind, D for hard of hearing; D and E with school psychologist; E—social worker coordinates the various evaluations; D and E with Director of Special Education, M.D., psychologist; B for physically handicapped children, A for mental retarded; C for physically handicapped children, A for mental retarded; A except D for homebound; E with Department of Pupil Personnel, health department, schools; D plus principal, director, psychologist, and teacher.

Table 6: Number of Participants in Review of Applications for All Types of Handicapped Children

No. of Participants	No. of School Systems
Twelve	1
Ten	3
Nine	3
Eight	12
Seven	15
Six	18
Five	15
Four	16
Three	9
Two	5
One	1
Total	98

predominantly the local Board of Education. In slightly more than one-quarter, the responsibility has been assumed by the state government, predominantly the state Department of Education. The participation of the health department, either local or state, is very small. Where the individual disciplines were listed under local government, there is medical participation in less than half of the methods (table 4).

In half of the public school systems, the Board of Education alone reviews the applications for special educational placement. In no instance is such review done by the Department of Health alone. In approximately one-fifth of the school systems the review is carried on jointly by the two departments, education and health. In only three school systems was the recommendation of the practicing physician acted upon without any agency review (table 5).

The number of professional personnel reviewing applications for educational placement ranged from one in one school system to 12 in another school system. The most frequent number of participants was six in 18 school systems. It is gratifying that in most school systems more than one professional person is responsible for the review of applications (table 6).

The type of professional person participating in review of applications is of the utmost importance. In table 7, the

Table 7: Type of Personnel Participating in Review of Applications for All Types of Handicapped Children

Type of Person	No. of Schools
Psychologist	87
Administrator	87
Nurse	57
Teacher	53
Social Worker	34
School Counselor	33
Director of Special Education	16
Vocational Counselor	8
Medical Participants	
Physician — type not specified	33
Orthopedist	19
Otologist	17
Family physician	16
Ophthalmologist	16
Pediatrician	12
School physician	13
Psychiatrist	9
Various medical specialists	8
Medical director	3
Neurologist	4
Cardiologist	3
Miscellaneous	4*
Miscellaneous	4**

*Composed one each of medical doctor in Board of Education Clinics; plastic surgeon; epilepsy; health department.

**Composed one each of Assistant Superintendent of Schools; speech therapist; Consultant in Guidance; Director of Health Service.

Table 8: Plan for Review of Applications of All Types of Handicapped Children Before and During Educational Placement and Prior to Withdrawal from It

Prior to Educational Placement	
Yes	94 (96%)
No	2
Yes — for cerebral palsied and homebound children	1
No answer	1
Total	98
Periodically during Placement	
Yes	83 (85%)
No	5
As needed	9
No answer	1
Total	98
Prior to Withdrawal from Placement	
Yes	68 (70%)
No	8
No answer	22
Total	98

most frequent types are the psychologist and the school administrator. The nurse and the teacher participate in about one-half of the school systems, the social worker and the school counselor in about one-third. There is limited participation by such personnel as the director of special education and the vocational counselor.

In all except 14 of the school systems, there was some type of medical participation in review of applications. It is surprising to find infrequent participation by certain medical specialists — orthopedist, pediatrician, ophthalmologist, otologist, and cardiologist — and none by the physiatrist (table 7).

It is considered essential that there be a careful review of all handicapped children, not only before educational placement but also periodically during such placement and prior to withdrawal from such placement. The questionnaire asked for information on all three aspects. Ninety-six per cent of the school systems indicated that they review all applications before placement, 85 per cent do so periodically during placement, and 70 per cent prior to withdrawal from placement (table 8). Inquiry also was made regarding the frequency of periodic review of the children during placement. Forty-five per cent of the school systems review children in special day class at least once a year; 39 per cent review children on home instruction at least once a year; 32 per cent review children in regular class at least once a year; 31 per cent review children in special day school at least once a year; 17 per cent review children in hospitals and convalescent homes at least once a year; and nine per cent review children in special residential schools at least once a year. The stated range of frequency of review varied from once a week (in one special residential school and on home instruction) to a complete lack of review for children on home instruction in two school systems (table 9).

Because it is recognized that "paper review" of children may not provide as complete a picture of the child, his progress, and his needs as when the

Table 9: Plan for Periodic Review of Handicapped Children During Placement

Frequency	Regular Class	Special Day Class	Special Day School	Special Residential School	Home Instruction	Hospital & Convalescent Home
Once a week .....	..	..	..	1	1	..
Once a month .....	..	..	..	1	2	..
Once every 6 weeks .....	..	..	..	..	1	..
Once every 2 months .....	..	1	..	..	..	..
Once every 3 months .....	..	1	..	..	1	1
Once every 4 months .....	..	..	1	..	..	..
Twice a year	6	9	9	..	8	6
Once a year	25	33	20	7	25	10
Once every 2 years	2	7	1	..	..	1
Once every 2-3 years .....	..	2	1	..	1	..
Once every 3 years	1	2	2	..	..	..
As recommended by local physician .....	..	..	..	..	3	6
Left to staff of institution .....	..	..	..	..	..	2
No definite plan	18	18	11	9	14	15
Frequency not stated	1	2	..	..	3	..
Prior to return to school .....	..	..	..	..	1	..
Not done at all .....	..	..	..	..	2	..
No information or not applicable	45	23	53	80	36	57
Totals	98	98	98	98	98	98

Table 10: Number of Personnel Provided for Personal Evaluation of Physically Handicapped Children

No. of Personnel	No. of School Systems
One	9
Two	13
Three	13
Four	4
Five	1
Six	2
Seven	1
"Team"	4
"Clinic"	2
Total Replying	49
Total Providing More Than One Person	40

child and his family are personally seen, the questionnaire contained an inquiry regarding the provision of a team of personnel, either from the Board of Education or the Department of Health, who personally see and evaluate all handicapped children. Thirty-eight per cent of the communities do provide such a team, 35 per cent do not, and 27 per cent did not answer this question. The numbers of personnel employed on a team basis for evaluation of the handicapped group vary from one person in about 10 per cent of the communities to

seven persons in one community. Most of the communities which do provide a team provide two or three people on the team (table 10). A psychologist and a physician (whose interest or specialty was not stated) were most likely to be used. Other personnel used with some degree of frequency were the teacher and the nurse. It is surprising to find that community facilities were used rarely, and that personnel such as the social worker, the school counselor, the school physician, and certain medical specialists (pediatrician and orthopedist) were used relatively infrequently. A physiatrist was used in one instance. Another surprising finding was that no school system reported using a Crippled Children's Clinic (table 11). In three communities there was team evaluation of physically handicapped children without any medical participation.

In approximately two-thirds of the public school systems there is a Department of Special Education with its own director. In approximately one-fifth of the public school systems special education is a part of another department of the school system.

Financial Aspects of Education of Handicapped Children. The source of

Table 11: Type of Personnel Engaged in Team Review of Physically Handicapped Children

Type of Personnel	No. of School Systems
1. Non-Medical	
Psychologist	18
Teacher	13
Nurse	7
Administration	7
Therapist	3
Director of Special Education	3
Physical Therapist	3
Social Worker	3
Occupational Therapist	2
Speech Therapist	2
Counselor	1
Physical Education	2
2. Medical	
Type not specified	20
Orthopedist	13
School Physician	4
Pediatrician	4
Neurologist	2
Psychiatrist	1
Physiatrist	1
Neurosurgeon	1
Medical Specialist	1
3. Community Facility Used	
Diagnostic and Treatment Center ..	2
Clinic Physician	2
Health Center	1
Consultation Clinics	1
Diagnostic Team	1
4. Miscellaneous	
Director of School Health	1

Table 12: Method of Allocation of Funds for Financing Education of All Types of Handicapped Children

Method	No. of School Systems
1 (per pupil)	32
2 (per teacher)	12
3 (per class)	15
1 and 2	6
1 and 3	7
2 and 3	4
1, 2 and 3	4
Per ADA*	1
2 and ADA*	1
No information	16
Total	98

*Average Daily Attendance

financing the education of handicapped children is predominantly a combination of local and state tax funds. A tremendous variation in the proportions of local-state participation in financing exists, the most frequent method being equal sharing of costs by local and state governments. The most frequent method of allocation of funds used for the education of handicapped children is on a per pupil basis; a per teacher or a per class basis is used less frequently (table 12).

The study questionnaire requested information concerning the cost of educating physically handicapped children in the various types of placement. This information was not readily available and was reported by only a small number of communities.

Provision of Transportation and Attendant Service During Transportation. Of the 98 communities reporting, 85 (86.7 per cent) provide transportation of physically handicapped children to and from school and 13 (13.3 per cent) do not. Thirty-five communities provide attendant service during transportation; this represents 35.7 per cent of the total number of school systems reporting and 41.2 per cent of the school systems providing transportation to physically handicapped children. In other words, 64.3 per cent of the total school systems reporting do not provide attendant service for the handicapped group; 58.8 per cent of school systems providing transportation to physically handicapped children do not also provide attendant service.

Discussion

It is evident from the foregoing that there is considerable variation in the various phases of the provisions for physically handicapped children within public school systems of the larger urban areas of our country. This variation exists in such phases as the age of admission to school, the various types of educational placement provided, the agencies responsible for establishing criteria for educational placement and the

degree of medical participation in this activity, the use of the health department staff for review of applications for educational placement, the number and types of personnel engaged in such review, the frequency of review of children during placement, the use of the method of team evaluation of the children, the composition of the team, and the use of existing community services for such evaluation, and the provision of transportation and attendant service during transportation. The author is not recommending uniformity in these practices because of a desire for uniformity per se, but rather so that the desirable practices and policies already adopted by some urban communities may be extended to other communities. Where these desirable practices have not been adopted, inappropriate educational placement of children may occur, and some medical, social, and vocational needs of children may not be fully recognized and met. For example, it was found in one community^{2,3} that approximately one-third of the physically handicapped children in special classes in public schools were inappropriately placed and could be in regular classes. Furthermore, it was found⁴ that one-half of the physically handicapped children on home instruction could be returned to school. One-half of these children on home instruction had additional medical needs; 15 per cent had social service needs; 15 per cent had vocational needs; and 23 per cent had recreational needs.

Certain recommendations therefore would appear to be pertinent, based upon the desirable practices developed in some urban communities. They include:

1. Some flexibility in policy should be provided to allow the admission to school of older preschool children who are moderately to severely disabled and who can benefit from earlier school admission.
2. The provision of a wide variety of types of educational placement for physically handicapped children, including regular class in regular school, special day class or special day school, home instruction, and instruction in a hospital.
3. Specific criteria should be established for the placement of any child in any of these settings. These criteria should be established jointly by the departments of education and health, aided by a variety of experts in the clinical medical fields concerned (orthopedics, physical medicine and rehabilitation, pediatrics and psychiatry), as well as a variety of experts in the non-medical fields (education, social work, public health nursing, psychology and vocational counseling).
4. A team of people, representing the above disciplines, should review the application of each child prior to placement, periodically during placement (preferably every three months), and before withdrawal from placement.
5. Whenever there is any question, the team should personally see the child and his family, rather than relying upon "paper" information only.
6. The physical setting of the school plant should be so modified as to permit most physically handicapped children to attend school. This modification includes ramps at the entrance to the school and within the school, an elevator within the school if the building has more than one floor, siderails, non-slippery flooring, easily accessible toilet, lunchroom and auditorium facilities, and a rest room. In addition, adequate examination rooms, counseling rooms and therapy rooms (physical, occupational, and speech) should be provided.
7. A safe and quick method of transportation should be provided, which would include attendant service and a vehicle which severely disabled children, including those in wheelchairs, could enter.
8. Placement of children in other than regular classes in regular schools should be made only after it is clear that the child cannot possibly fit into the normal setting.
9. Continuity of care and of data on records with adequate information from the treatment agent or agency is essential if there is to be an adequate picture of the child's course.

10. Wherever possible, the educational setting should be modified to fit the child, rather than attempting to place the child in a setting which may be inappropriate for him.

Summary

This paper reports on the findings of a survey conducted in 1958 to ascertain the status of school services for children with orthopedic, neuromuscular, or neurologic conditions in cities having a population of 100,000 or over. Wide variation exists in the range of services, policies, and personnel provided. Suggestions are made so that these children

may have the benefit of essential services in all urban areas.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.



Fancy the rapture
Of being there
When the world was made!

—EARL MARLATT

Perception in Hemiplegia: III. The Judgment of Relative Distance in the Visual Field

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● The ability to judge the relative distance from the observer of objects in visual space was studied in 24 hemiplegic and 10 non-neurologically damaged patients. It was found that monocular perception of distance relations was impaired in hemiplegics, but that the binocular perception of such relations was not different in the hemiplegic and in the control subjects. The findings are discussed in terms of the impairment of inferential functioning in hemiplegia.

In addition to the adaptive problems stemming from his motor impairment, the hemiplegic patient experiences difficulties in functioning that stem from the more general consequences of his neurologic damage. As an organism with cerebral damage he often manifests characteristic patterns of behavioral "organicity."^{1,2} Perceptual disturbances, also, frequently occupy a prominent place in the pattern of dysfunction and were noted to be important components of the disorder by Pierre Marie³ almost a half century ago. In spite of this early concern, systematic study of the perceptual concomitants of hemiplegia has tended to be subordinated to concern with the more readily apparent motor disturbance. However, recent neurophysiologic and clinical emphasis^{4,5} on the intimate relation between patterning of afferent input and the organization of motor acts has provided a renewed impetus for the study of sensory and perceptual change in hemiplegia.⁶⁻⁹

The present report is the third of a series concerned with the study of modifications of visual perception in hemiplegic patients. Our earlier publications^{6,7} presented evidence that in hemiplegia:

(1) the visual perception of the vertical and horizontal coordinates of visual space were conjointly rotated, and

(2) the judgment of the visual "straight-ahead" or median plane was systematically displaced.

These findings and associated observations strongly suggested the presence in hemiplegics of additional visual perceptual deficiencies including disturbance in the capacity to judge the relative distance from oneself of objects distributed in visual space. The present study tests the validity of these impressions through the investigation of the monocular and binocular judgment of relative object distance made by hemiplegic and normal subjects.

Procedure

The perception of relative distance was studied in a well-lighted room. The patient was asked to make judgments of the relative distance from him of two identical rods. One of the rods (the standard) was always at a fixed distance from the person. The other rod (the variable) was moved from trial to trial so that on different trials it was equally far from, nearer to, or farther from the patient than was the standard rod.

All subjects tested were seated in a chair with no restraint or restriction of movement and were instructed as follows:

"You see that one of the rods is stationary. I am going to move the other rod. Now, when I have moved it into a position, you tell me whether it is in *front of*, in *back of*, or *equal* with the stationary rod."

Tests were made under both binocular and monocular conditions. Under both conditions seven trials were given with the adjustable rod placed at a

This study was conducted in the Department of Physical Medicine and Rehabilitation, New York Medical College at the Bird S. Coler Hospital.

distance from the patient equal to that of the stationary rod and seven trials at each of a number of distances both in front of and behind the stationary rod. For binocular judgment the distances were 5, 15, 25, 35, 45, and 55 mm. in front of and beyond the standard. Since the difference threshold for monocular distance judgment is considerably higher than for binocular judgment, the comparison distances used for the monocular condition were 10, 30, 50, 70, 90, 110, and 130 mm. before and behind the standard. Distance settings of successive trials were randomly distributed. Binocular and monocular conditions were alternated. Half the patients had a first test session under binocular conditions and the other half under monocular conditions.

Subjects

A total of 34 patients was studied. Of these, 11 were right hemiplegics, 13 left hemiplegics, and 10 were patients with no known central nervous system damage who functioned as neurologically normal controls.

Results

Three measures were used to determine the capacity of the subjects to judge the relative position of objects in visual space.

(1) A threshold of absolute accuracy was represented by that distance at which a patient obtained 100 per cent correct judgments in perceiving the

variable rod to be in front of or in back of the standard.

(2) The over-all adequacy of relative distance judgment was represented by the percentage of incorrect judgments made in each category.

(3) The reliability of a judgmental response being made was determined by the degree of agreement with chance expectancy of the obtained judgments for each response category, i.e. front, back, equal.

The mean distance at which the variable rod was judged correct on 100 per cent of trials was determined for each of our groups. For computation purposes in the cases where a patient never obtained 100 per cent of correct judgments within the limits of the test distances, the greatest presented distance of the variable from the stationary rod was arbitrarily assigned as the 100 per cent correct point. These threshold values are summarized in table 1.

As may be seen in table 1, under binocular conditions there was no significant difference between the hemiplegic and control groups in the mean distance necessary to obtain 100 per cent correct judgments. However, under monocular conditions, although there was a significant rise for all groups in the mean distance at which the position of the variable rod was judged correctly 100 per cent of the time, the hemiplegic group required a larger mean distance of separation than did the control group to make 100 per cent correct judgments. The inferior perform-

Table 1: Mean Distance in Millimeters from the Standard at Which 100% Correct* Judgments were made.

		Total Hemiplegic	Control	Right Hemiplegic	Left Hemiplegic
Binocular	Front	24.61 mm.	22.0	25.0	24.23
	Back	18.81	20.0	19.55	18.07
Monocular Right	Front	74.19	64.0	64.55	83.84
	Back	98.22	76.0	88.18	108.46
Monocular Left	Front	83.63	90.0	77.27	90.00
	Back	90.35	74.0	88.55	96.15

*Eleven hemiplegic patients never reached 100 per cent correct thresholds. The farthestmost distance was arbitrarily assigned to them as the 100 per cent correct point for computational reasons.

ance of the hemiplegic group under monocular conditions is even more pronounced than this analysis would indicate, since 11 out of 24 hemiplegic patients never reached the 100 per cent correct threshold, even at the furthest-most distance of 130 mm. and therefore had 100 per cent thresholds assigned arbitrarily at these distances for computational purposes. Thus, 45 per cent of the hemiplegic patients were unable to reach a 100 per cent accuracy point within the limits of the distances presented. This inability was especially pronounced in the left hemiplegic group where 62 per cent of the patients failed to reach 100 per cent accuracy within the limits of the test distances. In the right hemiplegic group 27 per cent failed to achieve a 100 per cent correct threshold. In the control group only one of the 10 subjects failed to achieve a 100 per cent accuracy score. It is of interest to note that under binocular conditions no hemiplegic patient

failed to achieve the 100 per cent accuracy criterion within the limits of the test distances.

The mean percentages of incorrect judgments in each category, front, back and equal were computed for our groups and are summarized in table 2. The total hemiplegic group does not differ significantly from the control group in the mean percentage of incorrect judgments under either binocular or monocular conditions. When the total hemiplegic group was broken down into sub-groups (right and left hemiplegic) there again was little difference between the mean percentages of incorrect judgments for our groups. However, there was some indication that the left hemiplegic group made more incorrect judgments under monocular conditions than did either the right hemiplegic or the control group.

The mean difference in percentage between the expected and obtained judgments in each category under bin-

Table 2: Mean Percentage of Incorrect Judgments of Front, Back and Equal

		Total Hemiplegic	Control	Right Hemiplegic	Left Hemiplegic
Binocular	Front	19.75%	17.39%	19.72%	19.79%
	Back	14.87	20.86	15.17	14.48
	Equal	17.57	21.43	20.86	14.29
Monocular Right	Front	21.31	19.60	17.64	24.98
	Back	36.51	28.80	31.00	42.03
	Equal	39.64	34.29	36.43	42.86
Monocular Left	Front	27.23	30.00	23.94	30.98
	Back	30.64	26.54	23.39	33.30
	Equal	42.63	48.58	40.15	45.11

Table 3: Difference in Percentage Between Expected and Obtained Judgments

		Total Hemiplegic	Control	Right Hemiplegic	Left Hemiplegic
Binocular	Front	- 21.11%	- 15.48%	- 14.08%	- 18.15%
	Back	- 10.12	- 16.43	- 11.27	- 8.98
	Equal	156.00	198.00	151.00	162.00
Monocular Right	Front	- 5.15	- 14.90	- 5.58	- 4.72
	Back	- 31.11	- 25.62	- 37.84	- 34.39
	Equal	252.00	284.00	232.00	223.00
Monocular Left	Front	- 16.19	- 26.54	- 15.41	- 16.96
	Back	- 16.34	- 19.60	- 16.72	- 16.96
	Equal	237.00	208.00	237.00	237.00

ocular and monocular conditions is shown in table 3. The hemiplegic and control groups did not differ significantly in the discrepancy between expected and obtained judgments in any of the three categories under either binocular or monocular conditions. When the data were further analyzed in subgroups it was found that the right and left hemiplegic groups did not differ from one another in their discrepancies between expected and obtained judgments. All the groups made less than expected judgments in the front and back categories. The number of equal judgments rose for all groups under monocular conditions.

Discussion

The results of this investigation indicate that under binocular conditions, hemiplegic patients made judgments of relative distance that were not significantly different from those made by a group of control subjects. However, under monocular conditions the total hemiplegic group showed a significantly greater deterioration in performance than did the controls. It is of interest to consider these findings in the light of an analysis of the processes involved in distance judgment.

The judgment of distance and of depth is normally dependent upon the integration of a variety of afferent inputs. These may be divided into two main groups: (1) cues which are direct indicators of distance and which are directly dependent upon the magnitude and pattern of sensation originating in the visual apparatus itself; and (2) indirect determinants which are derived from the learned utilization of spatial organizations which are present in the visual field. The direct category includes cues derived from retinal image size, or from convergence, and accommodation, processes which are reflexly regulated and carried out peripherally by the action of the intrinsic and extrinsic ocular musculature. The second, or indirect body of

information utilized in distance judgment includes cues derived from interposition of objects, clearness of detail, change in relative size, shape or color, and movement parallax. The utilization of second category cues for judgment of relative distance among objects in visual space depends upon a long history of learning and the ability to make appropriate inferences for distance from the visual information that is available.

The necessity for distinguishing between cue categories for object distance perception is made more clear if one recognizes that cues such as accommodation and convergence are direct correlates of object distance and the information used in distance judgment, the direct consequence of changes in muscle tension. In contradistinction the utilization of a cue such as superposition among objects in the visual field as an indicator of distance may involve the use of what Hughlings-Jackson¹⁰ has called prepositional functions. Thus, for the adequate use of superposition as a basis for judging relative distance among objects, the observer must note that when two objects are visually superimposed one is totally visible whereas the other is only partially seen. From this direct experience he must then *infer* that the fully seen object is closer to him and the partially obscured one more distantly located.

It is possible to investigate the effectiveness with which individuals use either of these systems by studying the visual perception of distance relations between objects under binocular and monocular conditions. Under binocular conditions, the convergence of the two eyes to provide a coincidence of retinal images is the primary cue in distance perception. Under monocular conditions, this cue is not available and, although the weak cue of accommodation is still present, the task becomes increasingly one of interpreting the secondary cues for relative distance present in the visual field.

Since none of our patients in either the hemiplegic or control groups had conjugate eye movement problems, con-

vergence difficulties, or inadequacies in accommodation, it was not surprising that under binocular conditions no differences were found in the capacity to judge relative distance. However, in the monocular situation where judgment was dependent upon the ability to infer from indirect cues 46 per cent of the hemiplegic population could not score 100 per cent correct judgments within the limits of the test.

The inability to infer from limited cues as well as concretization of behavior was very strikingly illustrated in one of the hemiplegic patients. Under binocular conditions, she performed adequately. However, as soon as she was required to make judgments monocularly, she could not perform at all, even after repeated explanation of the task. When she was asked again to make judgments binocularly she exhibited no difficulty. However, under monocular conditions, when a pen and pencil were substituted for the rods, she could attempt to judge which of the two objects was nearer to her. In this instance, an increased contrast between stimuli and the use of familiar objects made it possible for the person actively to engage in the act of judging.

It is unlikely that the difficulties encountered by our hemiplegic patients under monocular conditions are a reflection of visual field deficits. Tests of the visual fields in nine out of the 11 hemiplegic patients who did not accomplish the 100 per cent correct thresholds within the limits of the test did not indicate any greater degree of constriction or field alteration than that which was found in patients who functioned successfully.

The finding that right hemiplegic patients performed more accurately than left hemiplegic patients is in apparent contradiction to other reported findings.² However, this result is probably the consequence of the selection of patients. In a task with three category judgments, it is virtually impossible to include right hemiplegic patients who suffer from either severe receptive or

expressive aphasia. No such simple *a priori* basis existed for the elimination of the most severely damaged persons in the left hemiplegic group, which undoubtedly contained patients who, although they did not have difficulties in making verbal statements, may have sustained greater cortical impairment than did the patients in the right hemiplegic group.

Summary

The ability to judge the relative distance from the observer of objects in visual space was studied in 24 hemiplegic and 10 non-neurologically damaged patients. It was found that monocular perception of distance relations was impaired in hemiplegics, but that the binocular perception of such relations was not different in the hemiplegic and in the control subjects. The findings are discussed in terms of the impairment of inferential functioning in hemiplegia.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.



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The Effect of Ultrasound on Conduction Velocity of Peripheral Nerve

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● The purpose of this study was to extend the information concerning the effects of ultrasound on human nerve in situations comparable to those in common clinical use. Changes in temperature of subcutaneous tissue and in conduction velocity of the ulnar nerve following exposure to ultrasound were investigated. The ulnar nerve region, in the forearm, was sounded in the normal human subject. Conduction velocity in the ulnar nerve and temperature of subcutaneous tissue were measured. When "sounding" was done without energy emission, both temperature and conduction velocity decreased. Conduction velocity decreased even at intensities of 0.88 and 1.28 watts/cm². With an intensity of 1.92 watts/cm², there was a relatively small increase in temperature (0.5° C.) and in conduction velocity (0.8 per cent). At intensities higher than this the temperature rise was smaller. If the area covered by the sound head was decreased the temperature rise and increase in conduction velocity were proportionately increased.

From the time of the earliest studies of the biologic effects of ultrasound, much interest has been focussed on actions on the nervous system. In 1929, Harvey¹ reported that when the sciatic nerve of the frog nerve-muscle preparation was sounded twitching of the gastrocnemius muscle could be observed. The curarized muscle did not, however, twitch. Pohlman and co-workers were the first to report the successful use of ultrasound in the treatment of sciatica and brachial plexus disorders.² In subsequent studies, the presence of clinical effects in situations in which the interaction of ultrasound with nervous tissue seemed to play a significant role was confirmed.^{3, 4}

Attempts have been made, through animal and human experimentation, to determine the mechanisms involved in this clinical effect, which was usually manifested as the relief of pain and spasm. In frog and mammal, at doses of ultrasound comparable to those used clinically, reversible or irreversible changes in the size of action potential, changes in excitability, and loss of conductivity have been noted.⁵⁻⁹ While increases in temperature of nerve may explain some of these effects,^{7, 10, 11} non-thermal effects may also play a role.^{6, 8, 9}

Fewer studies have been reported in the human, in relation to effects on nervous tissue at low to moderate intensities of ultrasound.

Alyea et al,¹² in experiments in the human, found that ultrasound, at an intensity of 1.27 or 1.5 watts/per square centimeter for five minutes, caused a slight increase in the threshold for perception of vibration sensibility. Lehmann et al¹³ found, in the human, that both ultrasound, at an intensity of 1.5 watts/cm², and infrared caused an analgesic effect distal to the point of application. It was felt that these two results were comparable and were due to heating of the tissues. In both these studies, the ulnar nerve was sounded in the ulnar groove of the humerus. Keidel,¹⁴ too, noted a rise in pain threshold in man following ultrasonic treatment.

The purpose of this study was to extend our information concerning the effects of ultrasound on human nerve in situations comparable to those in common clinical use. Changes in temperature of subcutaneous tissue and in conduction velocity of the ulnar nerve following exposure to ultrasound were investigated.

Methods

Two ultrasound generators were used in this study. Both operated at a frequency of one megacycle a second, with continuous output. The crystal area of one generator was seven square centimeters, while that of the other was 12 square centimeters. Temperature recordings in subcutaneous tissue were made with a copper constantan thermocouple and a Bristol dynamometer potentiometer. The thermocouple, in a 20

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gage needle, was placed in the vicinity of the ulnar nerve, and in the approximate center of the field covered by the moving sound head.

Conduction velocity was determined, using standard technics.¹⁵ The ulnar nerve was stimulated supramaximally at elbow and at wrist, with surface electrodes, and a 0.1 millisecond duration square wave (Grass S4B stimulator). Muscle action potentials, obtained through skin electrodes over the abductor digiti quinti, were amplified (Grass P5 preamplifier), displayed on a dual-beam oscilloscope (Hewlett-Packard 122A), and recorded with Polaroid-land camera (196A). A 1000 cycles per second time signal was used for time measurement. Before the stimulating and recording electrodes were placed in position, the skin was cleansed with acetone and electrode jelly was placed on the skin. At least 30 seconds elapsed between consecutive stimuli.

Experiments were performed on 28 normal subjects, 11 female and 17 male, ranging in age from 19 to 43. After control levels for conduction velocity or subcutaneous temperature were obtained, the ulnar aspect of the forearm was sounded for five minutes, at varying intensities, using the moving head technic, with mineral oil coupling between sound head and skin.

Group A (17 experiments). A sound head of 12 cm.² was used, and the ulnar aspect of the forearm was sounded from elbow to wrist. Intensities of 0.88, 1.28, and 1.92 watts/cm.² were studied. At each intensity, conduction velocity was recorded 3, 15, 30 and 60 minutes after the termination of sounding.

Group B (eight experiments). Temperature recordings were made after five minute periods of sounding, at varying intensities, and also with sound head movement, but without energy emission. The order in which the various intensities were used was randomized in the different experiments. After each period of sounding, a rest period of at least five minutes was introduced to allow for temperature stabilization. Both

generators were used, with seven square centimeters and 12 cm.² crystal areas. The area of forearm sounded was similar to that of group A.

Since the area covered by ultrasound in the above experiments was quite large, it was decided to repeat the experiments using a smaller area. In groups C and D approximately the middle half of the forearm was sounded and the area covered was approximately one-half of that covered in the experiments described for groups A and B.

Group C (10 experiments). A sound head of seven square centimeters was used, at intensities of 0 (no energy emission) and 1.9 watts/cm.² (with a five minute rest period). Temperature recordings were made.

Group D (eight experiments). The technic was exactly the same as in group C, except that the conduction velocity was measured, up to a period of 30 minutes following the cessation of sounding.

Results

Group A. As noted in figure 1 consistent decreases, of approximately two per cent, in conduction velocity were noted in the readings taken three minutes after termination of sounding, at intensities of 0.88 and 1.28 watts/cm.² This decrease was statistically significant at 0.88 watt/cm.², and of borderline significance at 1.28 watts/cm.² No significant change was noted after sounding at 1.92 watts/cm.²

Group B (fig. 2). In all subjects a decrease in temperature of subcutaneous tissue was noted on moving the sound head over the skin without energy emission. This decrease in temperature was greater with the larger sound head. The maximal decline of temperature was reached after approximately two and one-half minutes of "sounding". With energy emission, temperature increases were greater with

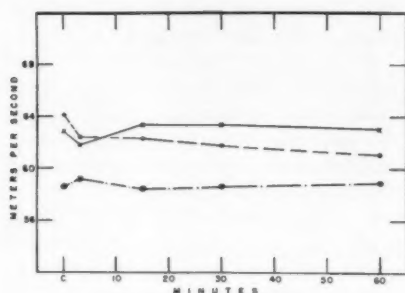


Fig. 1—The effect of ultrasound at intensities of 0.88 (crosses), 1.28 (closed circles), and 1.92 (open circles) watts/cm.² on conduction velocity in the ulnar nerve. The ordinate refers to velocity, in meters/second, the abscissa to time after completion of sounding. C. refers to the control level.

the larger sound head, at any one intensity. Increases were never great, and the average after five minutes of sounding at 1.9 watts/cm.² (seven square centimeters sound head) was only 0.5 C. Of interest was the significantly smaller rise in temperature with intensities greater than two watts/cm.²

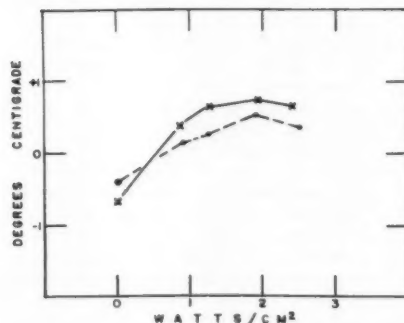


Fig. 2—Temperature rise produced in subcutaneous tissue by ultrasound. The ordinate represents the change in temperature, in degrees Centigrade, the abscissa, the ultrasound intensity. Crosses (X) represent values obtained with a sound head of 12.5 cm.² area, closed circles (•) those obtained with a seven square centimeters sound head.

Groups C and D (fig. 3). As in the earlier experiments, "control sounding" resulted in a decrease in temperature and in conduction velocity. When the area covered by the sound head emitting energy was decreased by approximately one-half, both the temperature

rise in subcutaneous tissue and the conduction velocity were doubled.

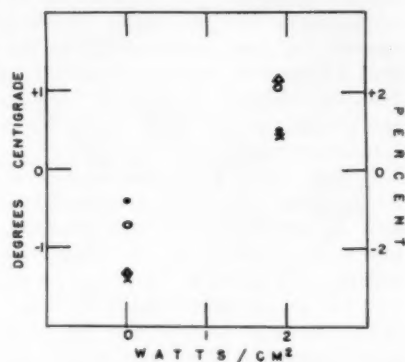


Fig. 3—Effect of variation of area sounded on change in temperature and in conduction velocity. Left ordinate refers to change in temperature, right ordinate to percent change in conduction velocity, and abscissa to ultrasound intensity. Open (O) and closed circles (•) represent temperature changes, crosses (X) and triangles (Δ) changes in conduction velocity. The area covered in experiments represented by closed circles (•) and crosses (X) is twice as great as in those represented by open circles (O) and triangles (Δ).

Discussion

It was not anticipated that sounding of the entire forearm, in a manner which might be used clinically, would result in such small changes in conduction velocity. Temperature rise of subcutaneous tissue with such a technic was not high, and, based on previous data,¹¹ one would expect that the temperature rise at the nerve would be much less. This small rise in temperature was due in part to the conduction of heat from tissue to sound head. This occurred even when the room temperature was at the relatively high level of 28 C. Prewarming of the sound head in warm water might be an appropriate technic, if a rise in tissue temperature is the change one is searching for.

More important as a factor in determining temperature increase was the effective area covered by the moving sound head. As might be expected, at a given intensity, the temperature rise and increase in conduction velocity were greater when the area covered de-

creased. Since, in the studies in which the ulnar nerve was sounded in the humeral notch,^{12, 13} an even smaller area was covered, it is probable that the temperature rise in nerve in those studies was much greater than in this one. There is no evidence available to indicate whether the technic used in the present investigation would be as satisfactory therapeutically.

It was expected that an increase in temperature could be produced not only by decreasing the area sounded, but also by increasing the ultrasound intensity. As noted in figure 4 there is, up to a certain point, a fairly linear relation between temperature rise and total wattage. This relation breaks down when the intensity gets too high—in this study above approximately two watts/cm.² (fig. 2). This would seem to confirm observations made elsewhere⁴ based on studies of blood flow, concerning vasoconstriction produced by higher intensities of ultrasound.

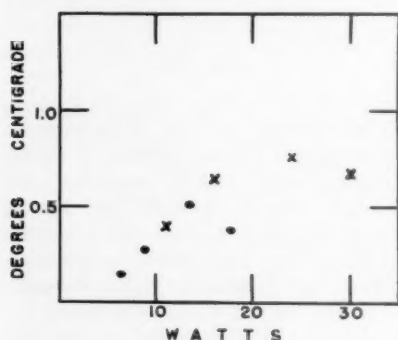


Fig. 4—Relation between wattage and temperature rise. Crosses (X) represent values obtained with sound head of 12.5 cm.² area, closed circles (•) those obtained with seven square centimeters sound head.

Summary

1. The ulnar nerve region, in the forearm, was sounded in the normal human subject. Conduction velocity in the ulnar nerve and temperature of subcutaneous tissue were measured.

2. When sounding was done without energy emission, both temperature and conduction velocity decreased. Conduc-

tion velocity decreased even at intensities of 0.88 and 1.28 watts/cm.²

3. With an intensity of 1.92 watts/cm.², there was a relatively small increase in temperature (0.5 C.) and in conduction velocity (0.8 per cent). At intensities higher than this, the temperature rise was smaller.

4. If the area covered by the sound head was decreased, the temperature rise and increase in conduction velocity were proportionately increased.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.



Cervical Spondylosis as a Cause of Spinal Cord Pathology

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● Cervical spondylosis is a disease of unknown etiology characterized by degenerative intervertebral disc changes and osteophytic formations impinging upon the nerve roots and spinal cord. It is believed that trauma plays a role in triggering the process of bone proliferation. Cord symptoms are thought to develop because of direct cord compression and angulation due to the ridges on the posterior margins of the vertebral bodies; and ischemia from compression of the anterior spinal artery and veins. The disease appears to be more prevalent in males and usually causes symptoms in the fourth decade or later. There may be a sense of heaviness or coldness in the arms and legs, aching in the legs, dysesthesiae, impairment of position and vibration sense, impairment of temperature sense, difficulty with gait including ataxia. Objective findings may include hyperreflexia, toe signs, sensory deficit atrophy and fasciculations in the musculature of the upper extremities. Laboratory investigation may show elevated protein in the cerebrospinal fluid, but often there is no abnormality. The differential diagnosis demonstrates that the disease is often confused with amyotrophic lateral sclerosis, subacute combined syndrome, multiple sclerosis, cord tumor and even cerebrovascular disease. The accepted surgical procedure is cervical laminectomy and section of the dentate ligaments. However, it should be noted that the benefits to be derived from surgical intervention are not yet clearly known.

Clinicians have known for many years that pain in the shoulder, arm and hand may follow compression of spinal nerve roots in the cervical intervertebral foramina by osteophytes. The process causing osteophytosis has been commonly called osteoarthritis or hypertrophic arthritis.

In the last decade it has become clear¹⁻⁹ that cervical osteoarthritis, or more precisely, cervical spondylosis^{10, 11} is associated with myelopathy as well as radiculopathy. Our purpose in writing this paper is to impress upon the physiatrist the mounting importance of the problem as well as its complexities.

Definition and Causes of Spondylosis

The spondylotic process has been well described by Payne and Spillane,¹² Payne,¹³ Horwitz,¹⁴ Hadley¹⁰ and Logue.⁸ The central feature appears to be a degeneration of the intervertebral disc. With aging, trauma, and perhaps the stress of daily neck movement, there is interference with diffusion of nutrients from the marrow of the vertebrae to the intervertebral disc. Subsequently

there is fibrillary change, dehydration,¹⁴ and fissuring of the disc material. The cartilage plates become fragmented and allow the passage of blood vessels into the disc. The degeneration begins in the annulus and continues as a fibrous tissue replacement of the nucleus pulposus. As the disc space narrows there is an approximation of the vertebral bodies. Mobility and bulging of the annulus increases. This causes increased traction on the periosteum to which the annulus is attached and stimulates proliferation of the bone of the margins of the vertebral bodies to form osteophytes. In time the osteophytes bridge the disc from above and below to form transverse bars or ridges.⁶ When the disc space is severely narrowed then osteophytosis may be stimulated directly by friction between bony margins of adjacent vertebrae.^{10, 15}

Payne¹³ points out that the first macroscopic change in the intervertebral disc is a vertical or a horizontal displacement of the nucleus pulposus. Disc narrowing appears to be due to this displacement. One result of the narrowing is osteophyte formation at the uncinat process which has been thought to be the site of a synovial joint. This area has been called the lateral intervertebral joint, the joint of Luschka, the uncovertebral joint, the covertebral joint, the neurocentral joint, the lateral interbody joint, hemiarthrosis intervertebralis lateralis,¹⁶ and synovial half-joint.¹³ The notion that this is a true synovial joint has been laid to rest by several authors.^{10, 12, 13, 17} This is an important distinction because the term spondylosis does *not*

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include changes in the synovial apophyseal joints—similar though they may be to changes initiated by disc degeneration.¹²

Confusion has been compounded by the fact that spondylosis has different meanings. Brain¹¹ distinguishes between a herniation of the nucleus pulposus and a protrusion of the annulus fibrosus. Both in his opinion can lead to spondylotic changes. O'Connell,¹⁸ however, distinguishes between escape of disc material (both nucleus and annulus) into the spinal canal at one level only and degenerative changes at multiple levels. Logue⁸ avoids the difficulty by stating that the hard transverse ridge of fibrocartilage, bone, and fibrous tissue is the entity implied by the term spondylosis. It is not incompatible with this definition to note that sometimes nuclear material may herniate through a tear in the annulus and become a calcified part of the ridge.¹² *Acute* herniations of the nucleus pulposus into the spinal canal are excluded from the definition.

Spondylotic changes are usually seen at several levels. Changes at a single level occur in 20 per cent.⁹ Bradshaw¹⁹ calls these single level changes *focal* spondylosis and feels that they result from traumatic nuclear herniation, while O'Connell²⁰ uses the term *secondary* spondylosis. He reserves the term *primary* spondylosis for those degenerative changes *not* characterized by protrusion of the annulus or herniation of the nucleus into the spinal canal. He qualifies this definition by admitting that exceptionally, disc protrusion may occur. Bradshaw¹⁹ considers spondylosis as osteophytosis of the vertebral rims and uncovertebral area with or without subluxation, whether this is a sequel to nuclear herniation or desiccation and degeneration of the disc consequent upon age. If we agree that disc degeneration entails *some* bulging and protrusion of the annulus fibrosus^{9, 21, 22} then apparent discrepancies in definition are resolved.

The causes of the intervertebral disc disturbance are unknown. Implicated in addition to aging and trauma are "insidious wear and tear" and abnormal fluid absorption by the nucleus pulposus¹³; "a metabolic process",⁶ failure of diffusion of nutrients from the vertebral marrow to the disc,¹² congenital anomalies,²³ and occupational trauma.^{15, 21}

Clinical Features in Myelopathy

The diversity of neurologic signs and symptoms has been well documented.^{1-9, 11, 19, 21, 24} Table 1 summarizes data in the author's series of 19 cases with myelopathy treated surgically. These data are in essential agreement with the studies cited. The significant features are the sex difference, variability in mode of onset, long duration of symptoms before the patient seeks medical advice, and the average age of 55 years.

Table 2 summarizes data concerning sensory impairment, motor impairment, and reflex changes.

The diversity of sensory deficit was particularly striking.²⁵ Dissociation between vibration and position sense, or pain and temperature sense was noted in a few.²⁶ The sensory level was never clear-cut. Unusual complaints of coldness in the legs or arms were often elicited. Also interesting was the frequency with which hyperactive reflexes were found in the upper extremities. From the neurologic findings one can infer that there was diffuse cord involvement with damage to the spinothalamic tracts, posterior columns, corticospinal tracts, and anterior horns. It is not hard to see how spondylotic myelopathy may be mistaken for amyotrophic lateral sclerosis, intramedullary or extramedullary cord tumors, multiple sclerosis, subacute combined syndrome, or even hemiparesis of cerebral origin.

Table 1

Number of Patients 19	Male 16 Female 3	Age Range (Years) 31 to 74 Average Age 55	Duration of Symptoms 3 months to 6 years Average Duration 25 months
Mode of Onset of Symptoms			
Trouble walking		3	
Arm pain and trouble walking		5	
Numbness in arms, stiffness in legs		3	
Numbness in legs		5	
Weakness in legs		2	
Weakness in arm and leg		1	

Table 2

Number of Patients with:		
Sensory Impairment	Motor Impairment	Reflex Changes
Vibration	Fasciculation	Increased deep tendon, legs
Position	Atrophy and weakness of arms ..	Increased deep tendon, arms
Pain	Weakness of leg	Decreased or absent abdominal
Temperature	Arm and leg weakness	Decreased or absent cremasteric
Touch	Bowel or bladder dysfunction	Babinski sign
Paresthesiae		Hoffmann sign
Dysesthesiae		Ankle clonus
Vague sensory level ...		

Radiologic Findings

Table 3 lists roentgenographic changes usually associated with spondylosis. All 19 patients had spine films which revealed some or all of these changes.

Allen² has remarked that the extent and position of the osteophytic formation cannot be gauged by radiography alone. Brain¹¹ has stressed the importance of lateral views taken with the neck flexed and extended, in addition to routine views. De Sèze and Hubault²⁷ feel that laminography is helpful in delineating the extent of osteophytic encroachment. Epstein and Davidoff¹⁴ suggest the value of stereoscopic films in the anteroposterior and lateral positions.

Donaldson²⁸ has cited the problem of assessing cord involvement due to spondylosis in the face of widespread radiographic evidence of this disease in asymptomatic people. Pallis, Jones and Spillane²⁹ point out the common occurrence of this disease in the elderly. They show that signs of cord and root

involvement are often elicited in people without complaints. McRae²² states that almost everyone over the age of 40 has at least one posterior cervical disc protrusion. However, roentgenographic evidence of spondylosis alone is not evidence for cord compression.¹¹

Cerebrospinal Fluid, Myelography, and Laminectomy

Table 4 summarizes cerebrospinal fluid protein data, myelographic and laminectomy findings.

The cerebrospinal fluid protein may be completely normal or moderately elevated.³⁰ It is rarely over 100 mg. per cent. Bradshaw¹⁹ has mentioned the absence of a manometric abnormality in the presence of a protein value of 120 mg. per cent. Kaplan and Kennedy³¹ emphasize that a manometric block will be missed if testing is not carried out with the neck extended. They explain the absence of block in some cases of cord compression, and the presence of block with normal cerebrospinal fluid protein as a reflection of

Table 3: Chief Radiographic Findings Associated with Cervical Spondylosis

1. Loss of cervical lordosis (sometimes development of kyphosis).
2. Subluxation of a vertebra.
3. Narrowing of one or more intervertebral spaces.
4. Osteophytosis with encroachment on the intervertebral foramina or the spinal canal.
5. Sclerosis of the vertebral margins.
6. Narrow spinal canal.
7. Congenital anomalies.

"intermittency" of block depending on head position. An alternative explanation is the fact that normal cerebrospinal fluid circulation continues by way of the lateral gutters in the presence of cord compression.²⁸

The chief myelographic abnormalities are posterior filling defects; widening of the ribbon of cord translucency; and anterior indentations opposite a vertebral body or disc space. Complete block is seldom encountered.³⁰ A central filling defect in the anteroposterior view, small though it may be, should be observed with suspicion.

Myelography is useful because it often shows that posterior osteophytes are much larger than had been suspected from plain views.^{3,21} One should remember however that so-called defects along the anterior border of the column of opaque material are accentuated by the depth of the anterolateral recesses

or gutters.^{12,22} Therefore in the presence of deep lateral gutters defects are best seen in the anteroposterior projection while in the presence of shallow gutters defects are best seen in the lateral projection.³ In general lateral views with patient prone and his neck hyperextended are most valuable.^{5,28}

None of the patients in our series was given a trial of conservative therapy. In all cases the sensorimotor deficit was considered severe enough to warrant surgical intervention. Laminectomy revealed cord compression and tight dentate ligaments in only five cases. In the eight cases where posterior displacement of the cord was seen, the neurosurgeon was not impressed that there was an appreciable degree of cord compression or that the dentate ligaments were under increased tension.

The Problem of Treatment of the Myelopathy

At present there is no definitive treatment. Results are generally disappointing.

1. *Medical (Conservative) Treatment.* There are no clear-cut indications for medical measures. Brain³² uses the following criteria:

- (1) age (patients over 50)
- (2) a long history of symptoms (presumably over a year)

Table 4: Cerebrospinal Fluid Protein

Range 31 mg. % to 135 mg. %	
Average—72 mg. %	
Myelography	Laminectomy
Widening of cord	Cord compression
Posterior indentation	Posterior displacement
Complete or partial block.....	Subluxation of vertebra
Anterior indentation	Decreased pulsation of cord.....
	Angioma of cord
	Free disc fragment
	Osteophytes
	Tight dentate ligaments

Table 5: Showing the Improvement (If Any) Following Laminectomy

Author	Improvement			Unchanged or Worse	Total
	Considerable	Moderate	Slight		
Northfield ³⁴ (1955)	13	—	9	16	38
Wahle and Mackenzie ³⁵ (1956)	—	13	4	11	28
Arnold ³⁶ (1955)	2	2	1	3	8
Epstein and Davidoff (1961)	1	1	—	2	4
Segerberg ³⁷ (1956)	3	4	—	—	7
Bradshaw (1957)	1	5	13	7	26
Sandler (1961)	3	6	5	5	19
Totals	23	31	32	44	130

- (3) spondylosis at multiple levels
- (4) generalized arteriosclerosis or hypertension.

The treatment may be bed rest, application of heat and massage, immobilization in a cervical collar, or any combination of these. The collar should be worn at least three months. A Minerva plaster collar is the method of choice by some and is considered preferable to surgery.^{33,34} Improvement is limited however with symptoms over one year in duration. Brain, Northfield and Wilkinson¹ and Clarke and Robinson⁴ felt that at least half the patients who tried collars were helped. As Logue⁸ points out there was no prolonged observation in either series.

2. *Surgical Treatment.* There are no absolute indications for surgical intervention either. Some criteria are:

- (1) rapid progression of symptoms
- (2) failure of conservative therapy
- (3) short duration of symptoms
- (4) spondylosis at a single level
- (5) age (patients under 50)
- (6) absence of cardiovascular disease

The operation of choice is a wide laminectomy with section of the dentate ligaments. In addition the dura may be incised and left widely open.³⁵ Logue⁸ summarizes results of laminectomy in several series of cases. The striking fact is that over half the patients are unchanged or worse—or at best only slightly improved. This agrees very well with the results in our series. Table 5, taken from Logue⁸ and modified to include some of Bradshaw's¹⁹ material and our own, emphasizes the failure of surgery.

Donaldson²⁸ cites the value of post-operative myelography. He found that the released cord may ride backwards and become compressed against the intact laminae at either end of the operative defect. Allen² believed that a posterior laminectomy was insufficient. He contended that the bony spurs themselves should be removed in order to regain the normal anterior glide of the cord. The danger of the posterior approach for excision of osteophytes is well-known.³⁵ Recently Cloward³⁶ and Smith and Robinson³⁷ have

advocated the anterior approach and interbody fusion. This approach minimizes danger of injury to the cord and roots by hemorrhage and retraction. It is the logical method of attack for total removal of a disc, resection of transverse ridges or foraminal spurs. Fusion may arrest the spondylotic process.³⁸ It is even possible that lipping and spur-ring may gradually disappear.¹⁵ In spite of the optimism of the proponents of this method, more time is needed properly to assess its value.

In respect to the older operation (laminectomy and section of the dentate ligaments) it seems clear that any chance of success depends on *early* recognition of symptoms and treatment.^{3,5,8,19,39} Even when this situation obtains there is no complete remission of symptoms. Evaluation of the effectiveness of surgery is made more difficult because of the lack of objective criteria of improvement and the varying lengths of postsurgical observation.⁸

The Causes of Spondylotic Myelopathy

It cannot be denied that anterior cord compression is one cause of spondylotic myelopathy. Bradshaw,¹⁹ however, points out that myelopathy is seldom related to direct cord compression. Nugent⁷ finds that the degree of cord compression seen at surgery may be unimpressive. Bolsi, Fasano, and Broggi⁴⁰ concur. Taylor⁴¹ sums it up well: "It remains to be satisfactorily explained how a syndrome commonly associated with compression of the spinal cord is produced without apparent naked-eye compression of the cord visible at operation or post-mortem." Payne and Spillane¹² concluded that some of the indentations seen in the cord at autopsy were artefacts produced by fixation. Histologic signs of cord degeneration in relation to the indentations were seen in only two of their cases. It appears that other factors in addition to compression are involved.

Table 6: Causes of Myelopathy

Direct cord compression by osteophytes.
Compression of anterior spinal artery and veins by osteophytes.
Compression of the vertebral artery by osteophytes.
Compression of a radicular artery in the intervertebral foramen by osteophytes or adhesions.
Hyaline degeneration of small intramedullary arteries.
Anchoring of the cord by the dentate ligaments.
Anchoring of the cord by root-sleeve fibrosis.
Posterior compression by a hypertrophic pedicle or laminal arch.
Posterior compression by inward projection of the ligamentum flavum as neck is hyperextended.
Arachnoidal and dural adhesions.
Effects of movements, stretch, and pressure against the spinal canal and any projection within it.
Trauma—surgical, accidental, occupational.
Developmental or congenital defects—narrow anteroposterior diameter of spinal canal, fusion of vertebrae, other.

Wilkinson⁹ relates the problem to general factors of compression, trauma, and interference with blood supply. Nugent⁷ invokes vascular, connective tissue and mechanical factors. Table 6 lists possible causes.

1. *Direct Cord Compression by Osteophytes.* Where compression is proved to be the cause of myelopathy the clinical picture may be variable. Symptomatology will depend to some extent on the level or levels of the protrusion, the size of the protrusions, and their location—midline, lateral or continuous.¹¹ O'Connell²⁰ makes a distinction between the compression caused by an extramedullary tumor and osteophytic ridges. He believes that the relative hardness and fixity of the osteophytes actually produce trauma to the cord. In flexion of the neck opposition of the dura and cord to the bony ridges becomes more firm and the anterior glide of the cord may be severely disturbed. Compression caused by a slowly growing extramedullary tumor, on the other hand, is relatively gentle and atraumatic.

2. *Compression of Anterior Spinal Artery and Veins by Osteophytes.* Mair and Druckman,⁴² on the basis of four autopsy cases, have proposed a relationship between the myelopathy and the territory of supply of the anterior spinal artery and its branches. Logue⁸ believes that repeated frictional injury

to the anterior spinal artery is one of the chief causes of myelopathy. Others^{43,44} however contend that areas of degeneration in the cord do not correspond to the territory of the anterior spinal artery. Höök, Lidvall and Astrom⁴⁵ found that the cord lesions in their autopsy case were not uniform and varied both in respect to the age and type of necrosis. Consequently they postulated that the cause was successive and temporary occlusion of different arterial branches, chiefly from the anterior spinal but some from peripheral arteries.

Compromise of the anterior spinal vein or veins may be deduced when the cords is hyperemic and the vessels are dilated.^{40,43,44} Brain^{11,12} implies that the arterial and venous system may both be involved.

3. *Compression of the Vertebral Artery by Osteophytes.* Several authors^{46,47,48} have pointed out the role that spondylosis may play in compression of the vertebral artery. Since this artery is such an important source of blood to the cervical segments of the cord,^{49,50} it is reasonable to assume that its compression may cause ischemic myelopathy. Evidence is not yet clear on this point.

4. *Compression of a Radicular Artery in the Intervertebral Foramen by Osteophytes or Adhesions.* Tureen,⁵⁰ Suh and Alexander,⁵¹ and Herren and Alexander⁵² have described the segmental character of the spinal circulation. The cervical cord is largely dependent for its blood supply on three to five anterior radicular arteries. These are small vessels of a caliber not exceeding one millimeter. Some may be barely 300 microns in diameter. Wollam and Millen⁵³ have shifted attention to the importance of the anterior radicular arteries by reminding us that the anterior spinal artery is in reality an anastomotic chain formed by ascending and descending branches of these vessels.^{12,50,51}

Bradshaw¹⁹ suggests that compression of one radicular artery may decrease blood flow to the cervical cord

by one-third to one-half, depending on how many radicular arteries are available. Tureen⁵⁰ has pointed out the tremendous variability in the number of anterior radicular arteries supplying the entire cord.^{2-14,16-18} This certainly should be considered as a factor in the production of myelopathy.¹³ Störtebecker⁵⁴ also cites the variability in arterial supply to the cord and stresses the lack of correlation between degree of spondylosis and neurologic symptoms. Pathogenesis of myelopathy in his opinion involves first radicular artery compression, then local chronic hypoxemia of the cord with subsequent degeneration.

5. *Hyaline Degeneration of Small Intramedullary Arteries.* Girard, Garde, and Devic⁴³ studied three cases and were impressed with the finding of hyaline degeneration of small arterioles in the interior of the cord. In all three there were degenerative and sclerotic lesions in the posterior and lateral columns which did not correspond to the territory of the anterior spinal artery. Brain³² mentions degenerative vascular changes.

6. *Anchoring of the Cord by the Dentate Ligaments.* Kahn⁵⁵ suggested that the lateral sclerosis of the cord was related to up and down movements acting through the dentate ligaments. He believed that they acted as a force which prevented dorsal displacement of the cord. Bedford, Bosanquet, and Russell⁴⁴ and Nugent⁷ noted areas of degeneration related to thickening of the dentate ligaments.

7. *Anchoring of the Cord by Root-Sleeve Fibrosis.* Frykholm⁵⁶ deserves credit for pointing out the role of root-sleeve fibrosis in abnormal fixation of the cord. Presumably such fixation would render the cord more liable to injury.^{7, 41, 44}

8. *Posterior Compression by Hypertrophic Pedicle or Laminal Arch.* Teng²³ feels that cord compression may result from hypertrophy of the laminae and pedicles. This situation may obtain more readily in the presence of forward

ward subluxation⁶⁷ of a vertebra. In this event the cord would be compressed between the lamina of one vertebra and the body of the one below.⁸

9. *Posterior Compression by Inward Projection of the Ligamentum Flavum.* Taylor⁴¹ has done careful work on cadavers using the technic of myelography which shows how the ligamenta flava bulge anteriorly as the neck is extended. This may cause recurrent trauma to a cervical cord which is raised upon an osteophytic bar anteriorly. Reid⁵⁸ has corroborated this work. Lewis⁵⁹ has remarked upon the thickening of the ligamenta flava in cervical spondylosis. He found a change in consistency and abnormally firm attachment to the adjacent laminae. On occasion there was some adherence to the underlying dura and a change in the appearance of the dura. Nugent⁷ and others⁶⁰ have ascribed special importance to these ligaments in the production of myelopathy.

10. *Arachnoidal and Dural Adhesions.* These certainly are not clearly separable factors since root-sleeve fibrosis and thickening of the ligamenta flava are related to adhesions. Epidural, dural, arachnoidal and pial adhesions, and adherence of thickened dura to the posterior longitudinal ligament are seen in spondylosis.^{7,9,24,43,44} Presumably they exert a tethering action on the cord which may produce traction injuries on neck movement.

11. *Effects of Movements, Stretch, and Pressure against the Spinal Canal and any Projection within it.* Reid⁵⁸ also has noted the discrepancy which may exist between severity of signs and symptoms; and the minor nature of the protrusions within the spinal canal, or the lack of evidence of cord compression. He found that flexion of the neck in cadavers caused an increase in the length of the spinal cord of 18 per cent. Measurement of the anterior component of force exerted by the spinal cord over a convex spine revealed values up to 30 to 40 pounds per square inch for a posterior displacement of the cord of

three millimeters. This was thought to be of significance in the development of spondylotic myelopathy.

Conversely the occurrence of mild or absent neurologic changes in cases of severe spondylosis may be related to loss of spinal movement or to laxity of the dura or to any combination of factors which inhibits stretching and anterior pressure on the cord.⁵⁸ This implies that with aging neurologic disability does not keep pace with the degree of spondylosis.

12. *Trauma — Accidental, Surgical, and Occupational.* Symonds⁶¹ has proposed that even normal movements of the neck may precipitate paraplegia in the presence of preexisting cord compression and ischemia. Injury may occur either on flexion or extension. O'Connell²⁰ has stressed the severe disability caused by flexion injury. Allen² has noted cord pallor and dorsal displacement on flexion during neck surgery. Munro⁶² has called attention to the poor prognosis following neck injury in elderly people with spondylosis. The hazards of hyperextension injury, whether accidental or during surgery, have been well described.^{7,9,24,32,41,61,63} Teng²⁴ has discussed the ways in which trauma may cause damage:

(1) disc herniation and subsequent degenerative change

(2) compression of the cord in a previously asymptomatic case of spondylosis

(3) aggravation of symptoms in established spondylotic myelopathy

Bradshaw¹⁹ states that occupational stress does not predispose to spondylosis but may, if spondylosis exists, increase liability to neurologic complication. Schmorl¹⁵ feels that the concept of spondylosis as a hazard of certain occupations is not a sound one. Miller⁶⁴ raises the question of sex difference in spondylosis irrespective of trauma. There does not appear to be any basis for this.¹⁵ The greater incidence of spondylotic myelopathy in males seems to reflect their greater physical activity

and as a consequence the increased hazard of trauma.

13. *Developmental or Congenital Defects.* Payne and Spillane¹² have found that in myelopathy due to cervical spondylosis the average anteroposterior diameter of the spinal canal is about 14 millimeters. The average diameter in uninvolved individuals is approximately 17 millimeters. In Nugent's⁷ series of cases with myelopathy the mean diameter was 14.7 millimeters. Posterior osteophyte projection narrowed the canal to a value of 10.9 millimeters. This is in good agreement with the data of Wolf, Khilnani and Malis⁶⁵ who found that a diameter of 10 millimeters or less due to encroachment of posterior spurs is likely to be associated with cord compression. Payne¹³ suggests that the hereditary, developmental or environmental factors which influence the size of the spinal canal are as important in the production of localized spondylotic myelopathy as the changes in the discs and vertebrae which constitute the spondylosis.

Nugent⁷ has observed that the clinical picture depends on a multiplicity of factors and the relative importance of each one. In any particular case a combination of factors may be involved. Although the pathogenesis of spondylotic myelopathy is far from clear, the answer probably lies in the constellation of causes already suggested.

Summary

1. Spondylotic myelopathy is a problem of increasing concern.

2. The cause of spondylosis is unknown but appears to be related to degeneration of the intervertebral disc.

3. The term implies formation of ridges of fibrocartilage, fibrous tissue, and bone.

4. The clinical picture in spondylotic myelopathy is exceedingly variable and is produced by diffuse damage to the cord which may range from mild demyelination to severe myelomalacia.

5. Radiologic evidence of spondylosis

may not be obtained without special views. Often myelography will show abnormalities not found on plain views.

6. The cerebrospinal fluid protein usually is normal or only slightly elevated. Myelography may show an arrest in the dye column but seldom a complete block.

7. Laminectomy may reveal absence of either cord compression or stress on the dentate ligaments.

8. Conservative treatment involves rest, application of heat and massage, and immobilization in a collar.

9. Surgical treatment is a wide laminectomy and section of the dentate ligaments. It is too early to assess the efficacy of anterior vertebral body fusion and removal of the bony ridges.

10. The possible causes of myelopathy are many and in addition to cord compression by osteophytes includes vascular factors, soft tissue changes, mechanical changes in the spine, trauma, and developmental anomalies.

11. In any particular case of myelopathy a combination of causes may be involved.

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Every production of genius must be the production of enthusiasm.

—DISRAELI

Role of Government in Rehabilitation

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• The role of government in rehabilitation is discussed by congressmen, government administrators and an American Medical Association spokesman. Such topics as the responsibility of the Public Health Service in research, service and facilities and the background of need and accomplishment in government programs are explored. Participants ranged from the viewpoint that much more needs to be done by government as well as by voluntary agencies in the field of rehabilitation to the viewpoint that the encroachment of government into the field of individual health can always extend to depersonalize and dehumanize medical service. Government programs in the field of rehabilitation in England and in Norway are described and explained.

CHAIRMAN KRUSEN: Will the meeting please come to order? It is an honor and privilege for me, as President of the 3rd International Congress of Physical Medicine, to serve as Moderator for this distinguished panel of statesmen, medical—and, shall I say, political, Senator Humphrey?—statesmen. (Laughter) For purposes of protocol, I have seated the distinguished participants alphabetically, from my left to my right, and I shall call upon them in this order.

It will be my purpose to ask each of the members of the panel to speak for 10 minutes, and then we will go into a general discussion among the members of the panel. I am going to have a chance to use what some of my friends call the "new egg-timer" for timing this discussion.

Without further ado, then, it is my honor and privilege to call on the Surgeon General of the United States Public Health Service, Department of Health, Education and Welfare, Sur-

geon General Leroy E. Burney. (Applause)

SURGEON GENERAL LEROY E. BURNLEY: Dr. Krusen and Members of the Panel, My Friends from the United States and Friends from All Over the World: I am pleased that on this panel we have one of the members of our Congress, who has taken such a vital and active part in promoting international relationships among physicians in the matter of health, Senator Humphrey. I am sure he will have much more to say relative to the importance of using health as a common denominator among the nations of the world in order to promote better understanding among these nations as well as the exchange of scientific information, for the benefit of all of our people.

President, 3rd International Congress of Physical Medicine, Senior Consultant, Section of Physical Medicine and Rehabilitation, Mayo Clinic, Rochester, Minn.; Director, Elizabeth Kenny Institute.

Surgeon General, United States Public Health Service, Department of Health, Education, and Welfare.

Representative to the federal House of Representatives from the State of Rhode Island, Second District.

Minister, Royal Norwegian Ministry of Health and Social Affairs.

Senior Senator to the United States Senate from the State of Minnesota.

President-Elect, American Medical Association.

Director, Office of Vocational Rehabilitation, Department of Health, Education, and Welfare.

Squadron Leader, Medical Rehabilitation Unit, Royal Air Force, Chessington.

Panel Discussion, 3rd International Congress of Physical Medicine, Special Session, Washington, D.C., August 25, 1960.

It is a great pleasure for me as Surgeon General of the United States Public Health Service, to take part in this 3rd International Congress of Physical Medicine. To my mind, the hope for man's future is never brighter than when men of many nations meet to advance a mutual purpose which transcends political and geographic frontiers. It is of the greatest significance that such meetings of minds, especially in fields closely related to human betterment, are becoming more frequent and more productive with every passing year.

The subject of physical medicine, to which your distinguished group is dedicated, has assumed its rightful position among the leading health disciplines. Human health is, in fact, indivisible. It is now recognized that preventive, curative, and restorative medicine form an unbreakable continuum.

The principal contributions of the Public Health Service are in three major areas:

1. Medical research and research training.
2. Construction of hospital and medical facilities.
3. Development of community services for the chronically ill and aged.

I shall devote a few minutes to each of these programs as it affects rehabilitation.

Medical research and training: The growth of medical research in the United States has been an outstanding factor in our national life and our international relationships during the past decade. American medical research in that period has emerged from an activity limited in its interests and conceptual scope to a comprehensive scientific effort, embracing the full range of biological problems affecting mankind. In 1950, American scientists were expressing their concern that many important areas of fundamental and clinical research were being neglected. Today, it can be said that no major field lacks thorough exploration. New fields

are constantly being opened; new methods of investigation are being developed in this country and abroad. America's capacity to profit by these changes, indeed, to produce such advances, has been enormously enhanced.

Neurology is probably the area in which American medical research has experienced the largest proportional growth since 1950. Neurological research is in a healthy state of ferment in most of our medical schools. This enhanced interest is due in large part to the impact of augmented funds for research and training through our National Institute of Neurological Diseases and Blindness.

The availability of new research technics, such as the use of electronic devices, has been another stimulating factor.

Finally, space probes present all major areas of biological research with the greatest challenge in history, but none has been more directly challenged than neurological physiology. Among the outstanding advances in basic research in these fields has been the elucidation of new theories concerning nerve regeneration, the formation of the central nervous system in embryo, and the electrical activity of the brain. Scientific observations in all three of these areas have important implications for the restoration of function in patients suffering severe neural damage. The research programs of our National Institutes of Health place major emphasis on fundamental studies of that type, which, we believe, will yield scientific information leading to practical advances.

Practically all of our institutes are supporting some research in physical medicine, though the specific projects may not be described as such. We have, for example, been supporting a number of projects on methods of rehabilitation of the aged with cardiovascular disease. Several university centers for research on aging, supported by our National Institutes of Health, include studies on the restoration of function in elderly patients with or-

thopedic diseases. Two long-term projects of particular interest involve a comparative study of rehabilitation programs for residents of nursing homes and an attempt to evaluate the efficacy of early home-care rehabilitation.

We in the Public Health Service are encouraged by the provision of the International Health Research Act of 1960, in which Senator Humphrey and Congressman Fogarty played such an important role. We hope that some expansion of our international research and training program will be possible under the Act of 1960.

Within the past three years, the Public Health Service has increased its support of international research. This year, the National Institutes of Health have allocated nearly nine million dollars to international research and training, as compared with about three and a half million in 1958. In 1960, 250 National Institutes of Health research grants have been awarded to scientists in 33 countries. One of these is to the Finnish Institute of Occupational Health for studies in physical medicine.

In 1959 a grant was made to the World Federation of Neurology for the dissemination and exchange of scientific knowledge in neurology, the stimulation of clinical and basic research, and the conduct of international congresses and symposia. Another grant has been made for an international study in comparative neuropathology of cerebrovascular disease.

The Public Health Service is assisting international research also through the exchange of scientific personnel. Last year, approximately 130 United States scientists received Public Health Service fellowships for study in other countries. In the same year, approximately 170 scientists from abroad were brought to the United States under our National Institutes of Health programs. The National Institutes of Health are also supporting the translation of Russian and Japanese scientific literature into English.

Construction of Hospital and Medical Facilities. The Service administers the National Hospital and Medical Facilities Construction Program. Through this program, the government awards grants-in-aid to the states for the construction of various types of facilities needed for the care of patients in American communities. The communities provide, on the average, two-thirds of the construction costs, and the government, one-third.

The facilities include general hospitals, mental and tuberculosis institutions, chronic disease hospitals, diagnostic or treatment centers, nursing homes, and rehabilitation facilities. In the development of rehabilitation facilities, the Public Health Service has the cooperation of Miss Switzer in the Office of Vocational Rehabilitation and its advisory council in reviewing state plans and projects.

We believe that every hospital, every nursing home, every medical center is a potential rehabilitation facility. Rehabilitation in our country and in many other parts of the world is too often planned around the problems of patients with static conditions—the amputee, the paralytic, the blind. We believe that medical rehabilitation begins the moment a physician sees a patient whose condition, obviously or potentially, will lead to disability. It should continue as long as the patient needs medical services to sustain his highest potential of active life. Hence, whether he is cared for in a hospital or a nursing home, the principles of rehabilitation should be applied.

Community Services. In the United States, we have special problems in meeting the needs of elderly retired persons, as well as those of severely disabled young adults who, for one reason or another, do not present a significant potential for employment. The states, the Service, the Office of Vocational Rehabilitation, and many other voluntary agencies are working together to solve some of these problems.

As many distinguished specialists in

physical medicine throughout the world have observed, it is often the prompt use of simple methods that averts severe loss of function. Moreover, the success of any method depends very heavily on sustaining hope and determination in the patient and his family. There is encouraging evidence from many parts of the United States that almost miraculous results can be obtained in the restoration of elderly persons through just such simple methods. They can be applied in the nursing home or in the house of the patient, with the psychological support of the family physician, visiting physical therapists, and public health nurses. To achieve such results, one needs to develop organized services in the local community.

There are in the United States about 250,000 beds in skilled nursing homes. More than 80 per cent of the patients are severely disabled, very old people. The states are working with the communities and the operators of nursing homes in an effort to introduce rehabilitation services in the care of these patients. During the past three years, much progress has been made. The majority of our state health departments have active programs in this field. The state of Wisconsin, for example, is providing rehabilitation services for residents of nursing homes.

Georgia is conducting a special program for stroke patients, in cooperation with the Public Health Service, voluntary agencies, and the private physicians. There are approximately 40,000 survivors of strokes in the state of Georgia. Often these patients have other serious medical problems and fill hospital beds over periods of time. Prolonged bed rest, dependency, and speech difficulties generate severe disability, as well as psychological problems, in these patients. Their disability creates social and economic difficulties for their families.

The Georgia stroke program includes education of the medical and nursing professions in the early use of physical therapy and early ambulation of stroke

patients. A demonstration clinic is being conducted at Grady Memorial Hospital, the teaching hospital of Emory University Medical School. Here, the stroke patients are seen on an outpatient basis, and appropriate physical therapy is prescribed. The family is responsible for carrying out the therapy in the home. A public health nurse visits the home periodically to instruct the family and to supervise performance of the recommended procedures. A team composed of a physician, a physical therapist, and a public health nurse is available to give intensive training in these procedures to physicians and nurses in local communities. The Public Health Service is developing a similar program for arthritic patients.

Another program, broader in concept than that of the Georgia stroke program, is of interest. This is a home-care program for disabled persons conducted in a rural county in North Carolina. It provides medical consultation, nursing, social service, physical and occupational therapy, health and nutrition education, orthopedic equipment, medicines, and sick-room supplies as needed. Residents of the county are eligible regardless of age, sex, or financial status, provided they possess a potential for self-care or self-support. All patients must be referred by a local physician and must remain under his care while receiving services of the program.

Gradually, our health resources are being mobilized and redirected toward the goals of preventing disability and restoring the disabled to active life. All our governmental agencies are aware that they can do, and should do, much more in this challenging field. The problems are so numerous and complex that one might begin anywhere and soon show some progress. We are not content with that approach. We want to move ahead in a purposeful fashion on the basis of careful, long-range plans. The Public Health Service and the Office of Vocational Rehabilitation have taken specific steps to that end.

A joint committee representing the two agencies is now engaged in a comprehensive study of our programs, and the task force is charged with the responsibility to define the respective roles of the two agencies in medical research, training, and programs related to rehabilitation. From its recommendations, we hope to move forward toward joint goals, which, if attained, will greatly strengthen our national efforts for the handicapped. (Applause)

CHAIRMAN KRUSEN: Thank you very much. It is now my pleasure to introduce to you a legislator, who is known to all of us in medicine for his keen interest in the field of medical legislation. He is the Representative from the state of Rhode Island, Second District, and is a member of our federal House of Representatives. It is indeed an honor for me to present the Honorable John E. Fogarty. (Applause)

THE HONORABLE JOHN E. FOGARTY: Dr. Krusen, Members of the 3rd International Congress of Physical Medicine: I appreciate deeply the honor of appearing with these distinguished panelists and leaders in the field of physical medicine and rehabilitation to discuss a subject of such vital importance.

I rejoice that the American people are waking up to what can be done for the handicapped people of our land, and I can assure delegates from the other countries that, as new ways are discovered to help people return to happy, rewarding, useful living, the benefits of discoveries will reach around the world for as we who are concerned with rehabilitation are aware that we must be interested in the whole man, so are we also very sure that we must be concerned with the health and well being of all mankind. The fullest sharing of progress is our wish, our desire, our dream, and our everlasting hope.

It is important to note that one of the first federally supported programs in the area of human betterment was that of vocational rehabilitation of dis-

abled adults. The first Vocational Rehabilitation Act was passed in 1920, inspired by the rehabilitation programs of the Veterans Administration. Since this pattern does not exist everywhere in the world, I might state that rehabilitation programs for veterans and rehabilitation programs for civilians are administered separately in our United States.

Under the first Vocational Rehabilitation Act, rehabilitation services were limited principally to programs of vocational training for disabled adults, but amendments in 1943 broadened the scope of the program to include physical restoration services. Now, within the limitations circumscribed by personnel, facilities and funds, the state-federal program can provide any service that is required to assist a handicapped adult in becoming employable.

During the 1960 fiscal year, rehabilitation was completed for over 88,000 individuals. It should be remembered that a disabled person is not labeled "rehabilitated" under this program until he is employed at a salary. We realize that physicians frequently refer to an individual as rehabilitated when he has achieved maximum return of physical function, but this definition is not accepted in the state-federal program.

There are several characteristics of this state-federal program of rehabilitation that should be interesting, particularly to those of you from other countries. First, this is a cooperative state-federal venture, with the federal government making grants to the states based upon a formula written into the law. State matching of federal funds is required. The average state share is 40 per cent of the total expenditures. The states operate the programs under conditions specified in a contract called a state plan.

Second, the program is nationwide in scope, and services must be made available by the state in all their political subdivisions. This means that rehabilitation services are available at least to

some degree in every crossroads of the United States. This, we have been led to believe, is different from what is found in many other countries, where rehabilitation services of the finest caliber may be made available in one part of the country but not in another.

Third, the states depend, in the main, upon local community facilities to provide rehabilitation services. The states operate very few rehabilitation centers and sheltered workshops, although law does not prohibit their doing so. Likewise, the states purchase medical services on a fee-for-service basis from physicians in the local communities. It is quite encouraging that the state-federal program of rehabilitation has had enthusiastic support of physicians in this country from its very beginning. It would be difficult, if not impossible, to operate this program effectively without the wholehearted support of physicians on the local level.

In addition to the state-federal rehabilitation program, which might be considered the backbone of federal support of rehabilitation activity, the United States government supports other rehabilitation efforts. I shall list just a few:

1. The state-federal crippled children's service is another grant-in-aid program providing assistance to the states to enable them to improve physical restoration services for handicapped children. This program was begun in 1935.

2. The Hospital Survey and Construction Act, under which the federal government has assisted the states in a gigantic effort to provide adequate hospital facilities, has a section earmarking funds for the establishment of rehabilitation centers. This program dates from 1954.

3. The President's Committee on the Employment of Handicapped, located in the United States Department of Labor for housekeeping purposes, receives a small appropriation from the United States government to enable it to mobilize public support for the employment of handicapped people. The

function of this organization is to help create a climate of acceptance for handicapped people in labor and industry. The United States Employment Service in the United States Department of Labor has a special counseling program for handicapped individuals seeking employment.

4. A beginning has been made in the United States Office of Education in providing technical assistance to the states in helping them improve special education services for handicapped children, and a program for training teachers of mentally retarded children is under way.

5. The Office of Vocational Rehabilitation of the Department of Health, Education and Welfare, which administers the Vocational Rehabilitation Act, also has responsibility for programs of research and training of personnel. Coordinating its efforts closely with those of the National Institutes of Health, whose activities will be discussed later, it concentrates upon development research in the rehabilitation field and upon demonstrations of methods and techniques that have been found fruitful. It encourages training of personnel to be used in rehabilitation by making grants to colleges and universities to assist them in establishing or strengthening their programs for training rehabilitation personnel.

Now, may I speak briefly of some of the unfinished business in rehabilitation.

1. In the first place, the state-federal program of rehabilitation is rehabilitating less than 90,000 individuals per year, which is only about one-third of the estimated annual increment of individuals who could profit from rehabilitation services. This program must be expanded to the point that the opportunity to benefit from rehabilitation services is available to every person who needs it at the time it is first needed. This will require much greater financial support, more better-trained personnel, and many more rehabilitation facilities.

2. Programs for children must be improved. The crippled children's service must be expanded, and new programs for the improvement of educational services for handicapped children must be developed. In both cases, federal support will be needed.

3. The present Vocational Rehabilitation Law limits services to individuals who will be employable. This results in the rejection of many severely disabled people who could benefit substantially from rehabilitation services, at least to the point where they could take care of themselves. We call this "independent living rehabilitation." The existing state-federal programs should be broadened to include services to this group of people.

4. Steps must be taken to reduce the time lag in the introduction of new rehabilitation technics into hospitals, nursing homes, chronic illness institutions, and so on. Knowledge and practice are too far apart. The accomplishment of this goal will probably require federal support for a sizable demonstration program.

5. Public welfare agencies must strengthen their programs of self-support and self-care to make sure the persons who benefit from rehabilitation services do not languish on public assistance rolls.

6. Additional rehabilitation facilities are needed. Present law does not provide federal assistance for workshops for the severely handicapped or for the many auxiliary rehabilitation facilities which are needed to complement the comprehensive rehabilitation centers being built under the Hospital and Survey Construction Act. A federal program of assistance for the construction of such facilities will be needed.

7. Finally, research and training must be expanded and improved all along the line, including programs administered by the Office of Vocational Rehabilitation, the National Institutes of Health, the Office of Education, and other agencies of the government with responsibilities in this field. At the same time, everything possible should

be done to encourage an increase in voluntary research effort.

This brief survey of unmet needs should emphasize the fact that we have no justification for being complacent with respect to the provision of rehabilitation services to our nation's handicapped people. Meeting these needs will require the dedicated efforts of all of us over a long period of time.

Now, finally, I should like to take a moment to congratulate Dr. Krusen for his leadership of this splendid 3rd International Congress of Physical Medicine. I wish you the greatest success in your presentations this week. I should like also to extend to you and the other members of this assembly a cordial invitation to call upon me at any time when I can be helpful to you. You will, I trust, also take back to your homes and to your countries our greetings and goodwill. We pray that you will reach your individual and collective goals in rehabilitation. The strides that you have made in the past offer inspiration for greater achievements in the future. Your own organization, the International Federation of Physical Medicine, has a tremendous part to play in this undertaking. I wish for you accelerated progress in your endeavors. (Applause)

CHAIRMAN KRUSEN: Thank you, Congressman Fogarty, for this inspiring address. It is now my privilege to introduce a distinguished health officer, whose wisdom and charm have won the hearts of the members of this International Congress. He is the Minister of the Royal Norwegian Ministry of Health and Social Affairs, from Oslo, Norway; the Honorable Gudmund Harlem. (Applause)

THE HONORABLE GUDMUND HARLEM: Dr. Krusen, Panel Colleagues, Ladies and Gentlemen: What I think I should try to do today is to comment upon this theme on the basis of thinking and experience in Scandinavia or in the Nordic countries, and doing so, to the best of my knowledge, keep to points of view which would, in Scandinavia, be accepted by all com-

munity groups and be common thinking, and leaving out points which appear to be accepted in all countries, for example, research, which you do in this country so very much.

Certainly, then, in principle, there is no problem in the role of government in rehabilitation in Scandinavia. The political problem is not whether or not government should play a role in rehabilitation, but the critique and the demand from the public and from the medical profession are that the governments and the corresponding bodies on the local level do not do enough and should do more. The critique raised—and this is, politically speaking, a very important critique—is that governments do not propose in their budgets enough money for the establishment and the running of rehabilitation services, and that governments do not secure the necessary leadership to make sure that training of personnel keeps up with the development in this, as in related fields.

This does not mean that governments are expected to run all rehabilitation services. There is room, ample room certainly, in this field for all who want to help—voluntary organizations, private individuals or groups—and we welcome them all, to do their best. But it is seen as the role of government to be responsible for giving leadership and for trying to make sure that everybody, in all parts of the country, can get the best possible assistance through rehabilitation services to develop himself to the point where he can live an independent, self-supporting life. I can assure you that we have a long way to go before we reach that goal, and the critique leveled against us is a valid critique. This may be done by non-governmental agencies, often in cooperation with governmental agencies, but if this does not develop, then it is seen as the role of government to make sure that this development does take place.

It is very much the same attitude as the one we meet regarding education, which in Scandinavia is believed to be

a right which should be given to every child and every citizen, if possible, free of charge. Really, rehabilitation is a type of education, a special education, physically and mentally, for those amongst us who are sick or injured or born with a disability, and who for that reason are individuals for whom society should feel highly responsible.

Looked upon from the point of view of the medical profession, of course, the natural attitude is to want the best possible facilities to do our work, whoever creates these facilities, and a situation where we can concentrate upon our help and assistance for the sick without difficulties arising because we may seriously damage the economy of the patient or may even be prevented from doing what we feel professionally should be done, because the patient cannot afford it.

The main point regarding government in rehabilitation which the medical profession, as expressed through the Norwegian Medical Association, is very anxious to guard and, I think, is a decisive point to be guarded, is that all appointments should be done on the basis of professional skill and experience and nothing else. I think this is such an important point that I would like to explain shortly how it works in Norway.

The Norwegian Medical Association has set up rules demanding that all medical appointments should be open to application from all medical doctors. From those applying, in most cases, the Surgeon General, on the advice of different boards for the different specialties appointed in cooperation with the medical association, names the three medical doctors most qualified and experienced, and one of these three must be appointed. This legally would apply only to members of the Norwegian Medical Association. As a matter of fact, it applies to all doctors, and it has literally meant that no doubt exists as to the pure professional basis for any medical appointment. I think this is of decisive importance.

The second main role of government

is, then, to try to secure that those who, on professional judgment, need rehabilitation service of any kind, also are able to pay for those services. This is part of our health insurance system, which basically is the same in the Nordic countries, and, since I so often meet rather great misunderstandings as to its principles, I would like to point out that it really is an insurance system, refunding the patient the far greater part, almost all, of his medical expenses, but leaving him free to choose whatever doctor he wants to choose.

It started as small mutual insurance funds in the guilds and the trade unions. Sixty years ago, in Norway, a national sick insurance system was created, open for voluntary subscription, and, at the same time, certain groups of wage-earners were incorporated in the system by law. The insurance premium was being paid partly or mostly by the individual, partly by his employer if he had one, and to a small extent by the municipality and state, that is, through taxation. During the years, it developed, and when we found that around 90 per cent had joined and that the greater part of the 10 per cent who had not joined were chronically ill or old people or otherwise poor insurance risks, who were for that reason not easily accepted into the insurance system, we made it compulsory for everybody—and this was done unanimously in the Parliament and with full support from the Norwegian Medical Association.

Again, from the point of view of the medical profession, two points are carefully guarded. First, the system is open and is used by everyone who has his medical license. There is no appointment of special doctors to serve for the insurance system. Second, the insurance system has nothing to do with what the doctor recommends or what the patient does; it just refunds on the basis of certain rules.

The third role of government is that of keeping the basic ideas of rehabilitation in mind when working with other problems more or less related. I think

of the legislation and practice of public assistance. I think of our main school system, which should do its utmost to make natural room also for disabled children. I think of legislation regarding disability insurance and disability benefits. It would be my thinking that any insurance contract which obviously would mean a great difficulty during the rehabilitation process to bring a patient back to an active life again should be illegal. I shall not enlarge upon this, but try to keep to the 10 minute limit.

Let me, Dr. Krusen, just add this: during the beginning of this century, there was considerable disagreement on the development of the social policy which now is established and accepted in the Nordic countries. Many feared it would ruin the morale and initiative and responsibility of citizens. Experience has shown this is not the case. But as long as this disagreement was there—and this disagreement to a large degree prevented the Norwegian Medical Association, for example, from playing an active role in this development, which had to come in any case—things happened to a large extent over the heads of the medical profession. During the last 20 or 30 years, especially, the Norwegian Medical Association has played an active and positive role in this development. This has meant that the whole functioning of our health and social services has improved considerably, both to the advantage of the citizens and not less to the benefit of the medical profession. Thank you. (Applause)

CHAIRMAN KRUSEN: Thank you, Dr. Harlem. The next man I shall have the honor to introduce is a man whom I have known for many years, ever since he was the young mayor of the city of Minneapolis. I have had some qualms about asking him to limit himself to 10 minutes, after it was reported that he talked for eight hours, without stopping, to Mr. Khrushchev. (Laughter) He is a dedicated leader in legislative actions toward the development of international medical research in

rehabilitation. He is a power in the United States Senate. It is, indeed, a delight for me to be able to introduce my friend, the senior senator from the State of Minnesota, the Honorable Hubert H. Humphrey. (Applause)

THE HONORABLE HUBERT H. HUMPHREY: Thank you very much, Dr. Krusen. My Colleagues on this Panel, All the Very Distinguished and Able Colleagues: Dr. Krusen, I had a full page of good editorial comment about each of my colleagues here, hoping to let everyone in this fine assemblage know of their outstanding qualities and of my high regard for them, but since you have limited me to reasonable limits and have not permitted me an eight-hour marathon, I shall forego the pleasure of uttering those words, except to say that, as a senator from Minnesota, I feel particularly privileged and honored because, to my right, the President-elect of the American Medical Association, Dr. Larson, is a native of Minnesota, and, to my left, Dr. Frank Krusen, one of the truly great medical leaders, is from Minnesota, and one of the members of your Executive Committee whom I see out here is an old friend of mine, Dr. Frederick Kottke of Minnesota. And I might add, if the rest of you want to move in, we would be delighted to have you, because you're all fine people. (Laughter)

Physical medicine and rehabilitation is not a subject of theory for us. We are deeply involved in it.

Dr. Krusen may recall that in my early public life, I interested myself in the vocational rehabilitation program and the rehabilitation center. I asked him to serve without pay on a committee when I was mayor of Minneapolis, to chair that committee, in fact, and we made some beginning progress. I have watched with great interest the developments at our university in the field of physical medicine and rehabilitation, and, of course, with great pride and pleasure, the contributions of the federal government to the university,

and the splendid work of our medical society and of our voluntary organizations.

It has been pretty well explained to all of you here, those of you who are our friends, and visitors from other lands—and I understand some 40 countries are represented—the relationships between federal and state government, but, surely, it would be wrong to indicate that physical medicine and rehabilitation, in any of its forms, was relegated or left entirely to governmental services; in fact, the overwhelming body of medicine in America is in private practice, and, of course, much of the work in rehabilitation is done by voluntary groups.

I have been very pleased to note, on occasion, that we in this country may have something to offer to our friends elsewhere, by emphasizing this spirit of voluntarism, the private contributions through foundations, through organizations in all fields of social endeavor, and of human endeavor. This can be particularly true in the areas of physical medicine and rehabilitation.

It was mentioned that I have interested myself in international aspects of medical research and health problems, and that is true. I have served now for several years as the chairman of a special subcommittee in the Senate engaged in the study of international medical cooperation and medical research in every area of the world and in every area of the great profession of medicine. This does not only deal with the governmental aspects, but also with the private or voluntary aspects.

One of our first reports is entitled, *Rehabilitation of the Disabled in Thirty-Seven Countries of the World: Domestic Programs and International Activities in Technical Assistance*. It primarily emphasizes the contributions that the United States of America has made in these areas of rehabilitation in other nations throughout the world.

We are engaged in right at the moment and have at the Government Printing Office, a volume of hearings.

These hearings, I say to my friends in the medical profession, are filled with wonderful testimonials of what is going on throughout the world, not just the United States but throughout the world, in government, in private practice, in universities, in voluntary groups, in the field of rehabilitation and physical medicine. One of the forthcoming publications is entitled, "The Activity of Non-governmental Organizations in International Health." This is a report on voluntarism in action.

Of course, while this is an international conference, we are essentially interested in our own country, we here in America and you in other countries, and I want to say just a word about our own country.

It has been well emphasized already what we have been doing and, I think, what we are not doing. The role of government in rehabilitation, so far as the United States is concerned, can be summed up in a few words. It is wonderful. It is essential. We have done quite a little. But we have done too little. It is undermanned, underfinanced, undersupported, and underresearched in terms of the need. Thus, their progress! And in this area, there is no argument. There should be and is no cold war in the field of medical research and particularly in the field of rehabilitation.

It is a fact that if I had my way, the first approach to better international relations would be a functional approach and not a political one—functional in medicine, in education, in science and research, in rehabilitation, in the things that we are talking about here—because medicine knows no politics if it is going to be medicine and if it is going to be science.

Well, now, what are some of the things that we might do, before that sand runs out here? I want to give a few facts about our own country. I don't know too much about other countries, and I think, maybe, we will do better if we concentrate on our own and then pool what we do.

We are moving forward in this country, as you people evidence by your presence and your skill, in the skills and achievements of physical medicine and rehabilitation. But we are moving backward in coping with the unfortunate growing backlog of people waiting to be rehabilitated; in other words, there are more people in need today than ever before, and, despite the efforts that we are making, we are losing ground.

I may have to stand corrected for some of these figures and if I do, we will correct the record, but this is an approximation, and I seek only to bring these figures out to point up the problem. There is a shortage of trained manpower, and there are, roughly, these shortages: there are about 340 of you expert doctors, certified by the American Board of Physical Medicine and Rehabilitation. I think we need at least double that number, to put it conservatively. We have a need for several thousand more physical therapists, now, not 10 years from now. The United States has about 6,000 occupational therapists. I think we need twice that number. And those are not my reflections, but the observation of experts. We have 500 social workers in rehabilitation. We need more, and this is true of nurses, speech therapists and so forth. As was pointed out by Congressman Fogarty, we are just plain running behind despite everything we do.

I want to compliment Mr. Secretary Flemming on his comments before your Congress earlier this week about a proposed program to rehabilitate these handicapped for independent living, and this would include, for the first time, extending rehabilitation to those who might not be able to be employed again but who can be rehabilitated to the point where they live independently.

I am sorry that this concept comes to us so late, but it is worthy of our support and I want to applaud it.

My final point is on the lack of re-

sources for this job that we need to do. We have in the United States, in our ownership, substantial amounts of foreign currency, fellow Americans. I authorized an amendment in Congress to put that currency to work for medical research, for rehabilitation, at home and abroad. Last year, none of it was put to work. This year, approximately \$960,000 has been allocated. We need 10 times that amount. I want to point out to you that currency is eroded away by inflation. It lies idle in many of the central banks of the world, waiting for some supposed use. The greatest contribution that we can make to the international aspects of rehabilitation and physical medicine is for exchanges, more conferences like this, this fantastic program that you have had, more meetings, more research, more plans, and then, if possible, to use some of these facilities, currencies and this money, for facilities, for workshops.

Of course, you can't get by with just the accumulated native currencies in foreign lands. You have to sweeten up the whole thing with dollars, fellow Americans, and those dollars will come back a hundredfold. I say that this is the wisest investment that we can possibly make, and I am delighted to have a chance to share these thoughts with you, thoughts that you have had, I am sure, and to commend you on this unbelievably instructive program for a great and splendid aspect of modern medicine. Thank you. (Applause)

CHAIRMAN KRUSEN: Senator Humphrey, the amount of applause indicates the reactions of the audience to your comments. It is next a pleasure for me to introduce another man with whom I have worked in the American Medical Association for many years. We have testified together before the federal legislators here in this city of Washington. He has now become the leader of American medicine, because he has just been made the President-elect of the American Medical Association. From Bismarck, North Dakota, Dr. Leonard W. Larson. (Applause)

DR. LEONARD W. LARSON: Dr. Krusen, Distinguished Members of the Panel, Ladies and Gentlemen of the Congress: May I pay my respects to Congressman Fogarty, whom I had the pleasure of serving with at the WHO meeting in Geneva a year ago, and also to you, Senator Humphrey, whom I consider one of the great leaders in the Senate. I was particularly interested in your "plug" for Minnesota. I didn't think it was entirely necessary so far as the Americans in this audience are concerned, because, after attending both conventions of the political parties, over TV, I got the distinct impression that Minnesota had taken over both parties. (Laughter)

To my friend over to the left, Lee Burney, with whom I have had the pleasure of working many times and to Miss Switzer to my right—she, I think, in collusion with Dr. Krusen, inveigled me into a job of serving on an advisory committee in her department. We have had one meeting and it was very stimulating to me.

I am a little bit at a loss as to what to say today. I am reminded of a situation I found myself in a couple of years ago, when I attended a meeting over in HEW that Secretary Flemming had called. When I looked around at the crowd, I thought, "Well, I'm here; whether I'm going to get thrown out or not, I don't know." But when I started my remarks, I said that I might be considered about as popular as a drunk at a Sunday School picnic, to which Mr. Flemming said this was no popularity contest and for me to go ahead. (Laughter)

With those preliminary remarks, I would like to give you my thinking on the role of government in rehabilitation. I believe that my position on this panel is certainly unique in that I am the only participant who is not representing a government. I speak only for the American Medical Association, a private voluntary organization dedicated to the furthering of the science and the art of medicine. Therefore, my position

on this panel, among government experts, is that of an interested, non-governmental observer.

I accepted Dr. Krusen's very kind invitation to come and offer the views of our organization concerning the role of government in rehabilitation.

I must point out immediately that American physicians recognize the immense importance of the many different aspects of rehabilitation, including social services, education, vocational placement, and the many others. However, speaking for the 178,000 physician members of the American Medical Association, I feel it is necessary to restrict myself to consideration of the medical-care aspects of rehabilitation and the role of the government in administering and financing rehabilitation programs.

The AMA attitudes towards government's role in providing medical care for rehabilitation is the same, fundamentally, as it is about medical care for the aged, veterans' medical care, indigent care and the like. Our philosophy on the role of the government can best be stated by the idea attributed to Abraham Lincoln, that the government should do for the people only those things which the people cannot do for themselves, and which need to be done. In our opinion, this principle should be carried out all along the line with respect to health programs and medical and hospital services.

The local or the town government should be responsible only when an individual and his family are unable to help themselves, the county only when the community is unwilling or unable to act, and the state only when the county is incapable of handling the problem, and the federal government only when the job becomes too big for the individual states, that is, when it is clearly a national problem of responsibility.

As citizens, we oppose any unnecessary or uncalled-for intervention by the federal government in state, local or individual affairs medical or otherwise, and, as physicians, we believe

strongly that private medicine is the best medicine.

Now, Dr. Krusen, I have been watching your apparatus there; is that time out?

CHAIRMAN KRUSEN: No.

DR. LARSON: I know that several of the other speakers used several glassesful. (Laughter)

Despite the dramatic scientific progress during the last few decades, the personal relationships between the individual patient and the individual doctor, those human elements involving confidence and understanding are still vital to good medical care. Unfortunately, the encroachment of government into the field of individual health can always extend to depersonalize and dehumanize medical services. This is our general opinion, but we realize that this issue is not one of black and white. We readily admit that many of the government's health and medical activities are obviously national responsibilities and can best be carried out by federal agencies.

For example, there is little argument over the basic purposes of the public health program, hospital and medical care for veterans with service-connected disabilities, and for members of our armed forces. Activities such as those of the Food and Drug Administration are clearly beyond the capabilities of states or communities.

Now, there is another area in which the federal government cooperates as a sort of financial partner with states, communities, and private organizations. This is when the federal government acts as a financial catalyst to stimulate state and local efforts in construction of hospital and research facilities, to support medical research projects and the development of adequate medical-care programs for the indigent. This is done through grants-in-aid or matching funds which provide only a certain portion of the costs of the projects or the programs involved.

In this realm of federal, state and local intercooperation, the American Medical Association has frequently

supported legislation which we consider to be sound and worthwhile. On the other hand, however, we have raised our voices in protest whenever we felt that the federal government was casting its shadow where it did not belong. We have openly and vigorously opposed any attempts by the government to provide or finance health care for large groups of private citizens who can or should assume that responsibility themselves.

We have been able to demonstrate that voluntary health insurance in this country is a far better, a far wiser solution to the financing of health care than any government-controlled, government-financed system. And here, again, let me emphasize that by government health care, I include rehabilitation, aging, welfare, and all other areas of complex concern.

I have been speaking generally about medical care. I hope that I have made it clear that the American Medical Association's policy regarding government's position in rehabilitation has been essentially the same as in all other similar fields. We try to confine our opinions to the medical-care aspects, since this is our specialty. It is our belief that the United States government need concern itself with rehabilitation only in those areas where individuals, communities and states are unable or incapable of doing the job. I believe, in closing, that physicians must and should assume the responsibility of protecting our medical-care system from unnecessary government intervention. The American Medical Association is pledged to cooperate with the government in the provision of the best type of medical care possible for its citizens. Thank you very much, Dr. Krusen. (Applause)

CHAIRMAN KRUSEN: Thank you very much, Dr. Larson. The next person is an individual to whom I am deeply devoted. I mentioned to you at our opening ceremonies that Secretary Flemming and I had agreed that she was one of the great career women in

government today. It has been my privilege to serve her as Special Assistant for Health and Medical Affairs, and I know that you will enjoy what she has to say. She is the Director of the Office of Vocational Rehabilitation in our Department of Health, Education and Welfare, Miss Mary E. Switzer. (Applause)

MISS MARY E. SWITZER: Dr. Krusen, Colleagues and Friends At Home and Abroad: It is seldom that I find myself speaking in this company with the opportunity of listening to so many of our leaders, political and medical, making speeches for me and telling how much more we need to do and how effectively we should organize to get it done. I get great satisfaction in being associated in a meeting like this with our congressional leaders from our legislature, such as Mr. Fogarty and Mr. Humphrey, who have always been great friends—supporters, dreamers and agitators—for a better and broader health and welfare program. But I like particularly to have on the record some of their convictions about what the possibilities are for the future, both in national and international health and rehabilitation work.

You have, I think, received a fairly good idea from the speakers who have preceded me of the broad responsibility that our government in the United States has assumed in the whole field of medical research and rehabilitation, as a service and as a program of research, too. I should like to emphasize in my two sessions of the hourglass the rather distinctive role that the part of our government for which I am responsible plays in this whole zone of health and welfare services.

It has been my privilege and opportunity to visit a good many countries of the world, to be part of international meetings in various fields concerning health and rehabilitation. I would be the last to say that I have mastered the details of the programs in many countries, but I think that it is fair to say that our Office of Vocational Rehabilitation is unique in the government

structure. It is rare because we have the total and prime responsibility for making effective a national policy which is directed towards the decrease of disability and the elimination of dependency.

Dr. Burney gave one of the finest descriptions that I have heard in a long time, either from him or anyone else, of what the Public Health Service's responsibility is in research, in service, in facilities. Mr. Fogarty certainly gave us the background of need and accomplishment of my program and of the others in the department. Consider a moment with me the advantages of having concentrated in one organization the responsibility for thinking at all times in terms of the disabled and handicapped individual, of those 88,000 people who have been mentioned so often since Secretary Flemming's opening remarks—of what they need, of what the rest of the handicapped people in the world need to get total independence instead of dependency. Sometimes we are accused of getting in everybody's business but this is the major role that we play. We need to get from the public health agencies of our country vastly more commitments to the programs for the prevention of disability which will diminish the need for comprehensive rehabilitation. We are accused of needing our school systems because they do not supply for our young people the training that is needed in the difficult fields of mental retardation, emotionally disturbed, and the victims of cerebral palsy and some of the other disabling conditions. But, most of all, we are responsible for administering the financial resources for this curious American anomaly known as the state-federal programs of service.

In our combined resources, currently, we have about 75 million dollars providing direct service to individuals. This includes medical care, surgery of all sorts and descriptions, ranging from the provision of artificial appliances to complicated open-heart surgery. In many places, special vocational train-

ing and placement, and all of the supporting therapies and services that have as their objective the guiding of a dependent disabled individual from where he is to what he has the potential to be are provided.

This involves a vast network of institutions for the serving of the deaf and the blind, workshops for the epileptic, experimental programs for the evaluation and vocational guidance of the mentally retarded, a new program of retraining and the redirection of community activity for the mentally ill, and the whole gamut of service and needs for disabled people, whoever they are and wherever they may be.

This is our basic support service for which we feel the government, state, local and federal, will always have to bear the major share of responsibility, because this is a national program. It has now become an international program, and it is one which requires the organization that governmental responsibility makes possible.

Now, in order to provide these services, other agencies like the Public Health Service and the Office of Education, and public and private welfare agencies must be stimulated to give attention to the problems of disability. Many responsibilities are placed upon the Office of Vocational Rehabilitation. Among the most important are the training of dedicated personnel, and the finding of the young and the older people to go into the many technical fields which lead up to total rehabilitation, ranging all the way from physicians, nurses, speech therapists, physical and occupational therapists, and so on.

We have a very far-reaching program in this field of training. Granted, it is insufficient to meet the total need, but it is growing all the time. It is understood by our people, and it is carried on in what has become, I think, a fairly common practice throughout most of the countries that are represented here today—government grants to institutions for assistance in teaching programs and for fellowships and scholar-

ships to support students in these various fields.

Closely related to that, of course, is research, and contrasted with the vast programs of the National Institutes of Health, our research program in rehabilitation seems rather small, but it is pinpointed and closely organized and growing all the time. This is a new field, extending from the fundamental research in the basic medical sciences, which is so readily available and easy to comprehend, into the more esoteric fields, if you will, of social and psychological research, in the practical business arrangements that are necessary for the development of employment opportunities for our people.

In this project-type of program we have developed, we have stimulated the imagination of many of our people, both at home and abroad.

There are two other points that I would like to make before closing. One of them has to do with the development that will be quite familiar to our colleagues from Scandinavia, particularly; that is, in the disability pension program that was established as part of our national insurance system four or five years ago. The principle of rehabilitation was underlined, and the partnership between the federal and state programs was enlarged and increased, in order that our social insurance program of payments for permanent and total disability could be brought close to the agencies that have, as the basic core of their philosophy, the rehabilitation and constructive approach to the recovery from disability.

And, finally, is it not remarkable that as we have become more conscious in our National government of the need for taking leadership in the management and control of disease and disability, our Congress recognized the great opportunity for collaborative effort with other countries. They have given us, as Senator Humphrey mentioned, the opportunity and obligation to use otherwise idle money to further the pursuit of knowledge and the

training of personnel in many countries throughout the world.

This has been the greatest legislative development of the past year, as far as those of us in rehabilitation are concerned. For the first time, we have a mandate to reach out and collaborate with our colleagues abroad. It is therefore a tremendous satisfaction to meet with many of you, to look forward to the meetings next week in New York, sponsored by the International Society for the Welfare of Cripples. We will have there a commission composed of colleagues from all over the world, in which Wynn-Parry has graciously agreed to serve with us, to identify research problems and research workers—so that we may go forward together, to reach the goal of overcoming disablement and disability.

Even in the four years since I met with you in Copenhagen, under the presidency of Dr. Clemmesen, we have made tremendous progress in our attitude toward disability, in our willingness to underline the need for equality of opportunity, in the belief that men everywhere have the need for work, and the opportunity for productive life.

In America, it is a great joy and pleasure to those of us who have been the beneficiaries of such wonderful hospitality, social and professional, in so many parts of the world to welcome you here in our Capital and to look forward to other meetings in New York next week and the week after. Such comings together are what really give reality to the ideals of life. (Applause)

CHAIRMAN KRUSEN: Thank you, Mary Switzer. The next and last, but not least member of this panel is a man who is especially well prepared to discuss this whole topic from a new angle as far as this group is concerned, because he himself is involved as a specialist in physical medicine with the Medical Rehabilitation Unit and is the Senior RAF Specialist in this field at the Medical Rehabilitation Unit of the Royal Air Force in Chessington,

Surrey, England. It is an honor to present to you Squadron Leader Christopher Berkeley Wynn-Parry. (Applause)

SQUADRON LEADER C. B. WYNN-PARRY: Dr. Krusen, Members of the Panel, Members of the International Congress: First, I would like to say what a privilege and honor it is for me to be serving on this panel with you. I must hasten to say that the original person who should have been in this position was Dr. Frank Cooksey, who knows more than anybody else in England the facilities about which I shall be speaking briefly. He was unable to come, and I am sure you in particular would wish that he could be in my place right now. You will be interested to hear, Dr. Krusen, that I like my eggs soft boiled, so I will try not to run over time. (Laughter)

I have been most interested to hear the views expressed this afternoon, and particularly interested to hear what Dr. Harlem had to say, because much of what I shall say is really fitting in the detail of what he has outlined in broad principle. I feel, from what he said, that our two countries have very much of similar establishments.

After the second world war in our country, the reconstruction of the medical services inevitably meant a nationalized health service. There was already a central medical control of hospitals during the war, made necessary by the bombing and the rest of the troubles. It was only a matter of adding in the general practitioner service, to make this a complete national health service. This was done without prejudice to private practice.

The extent of the problem of the chronic sick left by the war and even greater numbers of chronic sick resulting, of course, from the advances in the last 20 years in keeping people alive, has made it impossible, really, for a private insurance scheme to operate in Great Britain. The medical treatment is, of course, free, and this includes all the services of rehabilitation after acute illness, including residential rehabilitation centers, day centers,

prostheses and appliances of all types.

It is the department of physical medicine and rehabilitation in the hospitals that deals with the majority of rehabilitation and resettlement of chronic sick, particularly arthritics, chronic neurological disorders, orthopedic problems and so on, by virtue of the fact that these patients are receiving treatment in these departments, and it usually devolves on the consultant in charge of the physical medicine department to correlate and coordinate the resettlement services for that patient.

The local health authorities provide nursing aides in the home, special equipment, health visitors, educational facilities, home nurses and helps, and such services as the "meals on wheels." The local welfare authorities provide such things as adaptation to the home, ordering baths for the disabled, widening doors for wheelchairs to come in, providing ramps and so on, and the welfare officer can arrange for transport, recreational facilities, and holidays for permanently disabled people who would otherwise not be able to get to work.

By the advances in technics of rehabilitation and better understanding of the benefits of social rehabilitation, much can be done for the disabled, either to be trained to be independent and thus release a member of the family to go out to work and help support the family who would otherwise be fully occupied in looking after this person, or by providing day centers where they can be left and looked after during the day, whilst some other people in the family go out to work.

I have tried briefly to outline, first of all, the facilities that are available by statutory right to all people in their homes.

The second problem that I want to speak briefly about is the question of resettlement, the rehabilitation of the patient back to work, doing a useful form of work. At every labor exchange throughout the country, there is a gentleman called the Disablement

Resettlement Officer, and he is an official of the Ministry of Labor whose job it is to acquaint the disabled person referred by his doctor, whether the general practitioner or hospital consultant, with the facilities that are available to that patient by right, for him to get employment or get grants for training and so on.

He first registers this patient as a disabled person, and I must point out that registration is entirely voluntary. No patient need register as a disabled person if he doesn't wish, but the benefits of registration are impressed upon the patient because he is then able to make use of certain facilities which would not otherwise be available to him. If there is any doubt in the physician's or the DRO's mind as to the patient's ability or disability to carry out some particular job, he may be sent to an industrial rehabilitation center, where he is carefully assessed by skilled people for a period of about six weeks, to see what sort of employment he would be best suited to. But, by and large, one only rarely needs to use these centers, because good medical care and good assessment in such places as the occupational therapy department or workshops or the hospital center should make it unnecessary for more than a small proportion of very difficult cases to use these facilities.

Patients, particularly young people who are disabled, who require retraining, may be sent to one of the government training centers, where a wide variety of different skills, or crafts, mechanical engineering trades or clerical trades, are taught, and these patients have six-month or 12-month courses of training, at the end of which time they are regarded as semi-skilled and are absorbed into industry, under a particular employer. Their wage is not the full rate for the skilled job but the difference between what the patient is paid and what the normal rate should be is given to the employer to compensate him for having not a fully skilled man. This goes on for, perhaps, two years.

Now, in a lot of trades, of course, the patients may not wish to take advantage of the government training scheme, and for those people grants are available to universities or even to set up a business on their own.

As for the really severely disabled, there are sheltered workshops, which you may know, where people totally unable to compete in open industry can be given some form of productive employment, working at a slower rate than in industry, where they are at least contributing to the economy and not being wasted by not producing.

There are about three quarters of a million registered disabled people in England at the present time, but only 10 per cent of those really need substantial help, and one per cent of those are the hard core of unemployable people. With some six thousand people employed in workshops, you can see that the problem is being fairly adequately coped with.

Every employer who has more than 20 people on his staff has to have three per cent of disabled. This means that throughout the country, there are disabled people being employed by statutory legislation in industry. This does work very well, in fact, and one example of it is that when there was a sharp rise in unemployment not so long ago in England, the number of disabled unemployed did not rise to anything like the extent of the able-bodied rise. The well-resettled disabled man has a lower absentee rate, as has been proved, and tends to bury his grandmother rather less often for purposes of baseball matches and so on than the able-bodied man. (Laughter)

Industry, these figures show, seems to look after its disabled remarkably well, and we find in England, once we have settled a disabled man satisfactorily in a job, that industry or that employer will be after more, very much more than his quota.

Now, finally, I want to point out that the national government in our country acts in two ways: one, the direct way, as I have tried to point out to you,

through the hospitals, doctors, rehabilitation centers, medical services, and training centers, government schemes, factories, and so on; but, secondly indirectly through grants to voluntary organizations.

A great deal of care of the disabled is done in England by the voluntary societies and a great deal of money is given by the government, by subsidy, completely without any strings, to these voluntary associations, so that they can develop facilities for the disabled, thus canalizing the feeling that many people have, of wanting to help disabled people, by their own efforts and not through statutory legislation, and account is taken of this splendid feeling by these government subsidies.

There are, of course, difficulties in these schemes. Those of you who have had experience with the British system know that one of our problems is that there are a lot of authorities to try to coordinate, a lot of time has to be spent on coordinating all the various facilities, and there are occasions when integration is required, but these difficulties can be solved and will be solved.

Another problem is bringing the facilities to everybody in the country, and this is not always easy, particularly when you have an agricultural area and the patient is unfit due to disability for any of the type of employment there is in that area. The difficulties of moving to another place are, of course, great.

But I think by now my egg is well on the way to being hard boiled, so I should, perhaps close by merely saying that if any of you want advice on how to set up a national health service, I shall be prepared to speak to you in private after the meeting. (Applause)

CHAIRMAN KRUSEN: Thank you very much, Squadron Leader Wynn-Parry. Senator Humphrey, who is known for his rapidity of speech, says, "Boy, does he speak fast!" (Laughter) He is lost in admiration.

We have time for some panel discussion, and there are one or two questions that have been brought to my attention which I thought the panel

might be willing to discuss or answer. One is the following question, which I will take the liberty of directing to Surgeon General Leroy Burney. As you, of course, realize, all of us gathered here at this 3rd International Congress of Physical Medicine are deeply concerned with disabling diseases, poliomyelitis being one of them. The recent announcements by Surgeon General Burney concerning live poliomyelitis vaccine have been encouraging many of us. Some of the group have been wondering if we might discuss the question of whether there is reason to hope that with the use of the oral poliomyelitis vaccine as a booster for the killed virus vaccine of Salk, poliomyelitis will eventually thus be eradicated.

SURGEON GENERAL BURNEY: Dr. Krusen, I am rather pessimistic about eradicating most diseases. We have had a few which are practically eradicated. I do not believe that the live vaccine may complement the Salk killed vaccine and perhaps induce many millions of people who have not availed themselves of the Salk vaccine to come to be vaccinated because many people fear needles. The scientists have provided the means for preventing nine out of 10 cases of paralytic poliomyelitis, but we still have not the scientific information of how to get people to avail themselves of this knowledge.

We have 40 million in the United States at the susceptible age groups who have not had the full three doses. I do not believe that we will get all these 40 million people injected or vaccinated if and when live vaccine is licensed and available.

CHAIRMAN KRUSEN: Thank you very much. There was one other question in this regard, General Burney. There was something, I believe, in the wording of your statement which suggested that the Public Health Service would specify dosage of the live vaccine, and some physicians have interpreted this as a possible interference with their license to practice as they feel they should, without dictation.

Have you a comment on this?

SURGEON GENERAL BURNEY: Dr. Krusen, we still have some questions relating, or I should say, the scientists still have some questions relating, to the possibility of serial or of return to the virulent state of the non-virulent vaccine through serial passage. If this vaccine, when it becomes available, is given on an individual basis, all the studies that we made throughout the world on the use of the live vaccine have been on a communitywide or mass basis, and the advisory group, which is advisory to the Public Health Service on the live vaccine, indicated that it felt it would be remiss in its advice to the Surgeon General if it did not point up the importance of the method of administration as being an important part of this, and I expect to call together, Dr. Krusen, in the early fall, a group representing organized medicine, general practitioners, pediatricians, state and local health officials and voluntary groups to discuss the use of this vaccine when it becomes available.

CHAIRMAN KRUSEN: Thank you very much, General Burney. I think this is reassuring. There is another question which has been asked in regard to the international problem, and I am going to ask Senator Humphrey if he will comment upon it. It has to do with what is commonly called "soft" currency. Since Senator Humphrey touched on this and mentioned that a sum had been allocated this year which could be released for rehabilitation facilities in certain countries where such currency was available, we are interested, I am certain, some of us, in knowing in which countries such funds might be available, and we would like a little further discussion of this subject, Senator Humphrey.

SENATOR HUMPHREY: Well, first, Dr. Krusen, let me say that, as you know, very recently, the President signed into law what we call the International Health for Peace Act, Public Law 86610, which was sponsored by Senator Hill and Congressman Fogarty in the House and others. I was the co-

sponsor in the Senate. This particular act gave the green light for the use of foreign currencies for these programs of international medical rehabilitation research in particular, so we've got a rather organized type of program in terms of structure now.

Regrettably, it did not add one nickel in hard currencies. I want to repeat that. You see, I'm a sort of backwoods pharmacist. You sometimes just can't have a pure drug. You have to put something in it, you know, so the hard currency is the sweetener for the soft currency. If you just have soft currencies all the time, it's like trying to keep a horse alive on sawdust. It doesn't really work. You need a little hay.

Now, I want to get this in first, Dr. Krusen, because I don't want any of my fellow Americans to think that we can do wonders in the field of international medical research just by soft currencies. We Americans call them "soft currencies." They are not soft to you. They're hard to get, I'm sure, wherever you come from.

The other point that I want to make is that we generate or obtain these currencies in other lands today primarily from the sale of American agricultural commodities under a program that we call Public Law 480. There are other currencies available, left over from certain aspects of the earlier economic aid programs, but most of the currencies which are currently available and being made available come from the sale under Title I of Public Law 480, what we call surplus agricultural commodities.

Regrettably, in one way, the largest amount of the soft currencies is in the countries that have the least, in terms of technical skilled personnel and facilities. To put it another way, our European friends, where there is a high degree of specialization, have the smallest amount or the smaller amount of the foreign currencies that are in the account of the United States.

Now, that is a general statement. There are countries, however, where there are currencies, for example, Fin-

land, and a great deal can be done in Finland with the soft currencies. I was at the Brain Damage Institute in Helsinki. It is a remarkable facility. Much can be done.

Furthermore, something else can be done. We have in Italy substantial amounts of currencies. In Spain, a great deal of the Spanish peseta is to the account of the United States; in Greece, a very large amount of currency; in Poland, we have a couple of hundred million or more dollars in Polish zlotys; in—

MISS SWITZER: In Israel and India.

SENATOR HUMPHREY: We have a million dollars of rupees in India; in Pakistan, Israel, and Indonesia. I was trying to think of any Western European countries other than those that I have mentioned. I believe that's just about all. But we have some in Latin-American countries.

It seems to me that here is a real possibility of extended research, expanded research. These currencies can also be used not only for research, but also for facilities.

MISS SWITZER: Training.

SENATOR HUMPHREY: Yes, workshops and training. I have a feeling that, now that the law has been passed and we've got a chance to take a good look at it and to deal with it, we will be able to do considerably well with it.

MISS SWITZER: Mr. Chairman, can I supplement this? We happen, in the Office of Vocational Rehabilitation, to have 900 thousand dollars scattered through a number of countries in these funds for this current year, in addition to the further authority under the Health for Peace bill. I would just like to advise any of you who would be interested in detailed discussion of how you get a project going, if you are going to be at the meeting of the International Society for the Welfare of Cripples next week in New York, we are going to devote all day Wednesday, beginning in the morning, to a group discussion

with any people from the countries we have been in touch with, who can participate in research or training programs, and we would be glad to see you, to answer any questions and to give you the information that we have developed thus far.

We think that there are a number of very encouraging things we can do together, and we want very much to take advantage of the confidence that our legislators like Senator Humphrey and Mr. Fogarty have placed in us that we can accomplish something, difficult though it may be, with the so-called counterpart funds.

SENATOR HUMPHREY: May I add just one thing further, Dr. Krusen? A number of years ago, we made a tour of 10 countries in the field of medical research, and visited, I would imagine, with some of you who are here. It was a revelation to me and a great experience in terms of education.

I found that one common denominator was that practically everybody we talked to in the European countries, in particular, said that what is needed is not just somebody coming from my country—the individual, say, to the United States or from the United States to my country—but many of these countries do not have the money that they need—and, by the way, health generally gets on the low end of the finance officer's priority list. Many of the countries just don't have this money. If there were some way that these soft currencies could be made available, for example, so that if you had currency, let's say, in Finland, and there was to be a conference in Rome, these currencies could be made available to up-and-coming young Finnish scientists or doctors to go to a conference in Rome, and Italians to attend a conference in Warsaw or to attend one in Paris, with American-owned funds—I think you can do it under the new authority and possibly even under Public Law 480 authority. But this, I think, has real possibilities, because, in these extended currencies, we were told that much does come, as you found out

here, and, regrettably, too many of the younger members do not have the opportunity; the younger people in the field of science and research do not have the opportunity to go to these meetings and if the moneys could be made available out of these currencies, it would be helpful.

CHAIRMAN KRUSEN: Thank you, Senator Humphrey. I have one final question which I should like to direct to Congressman Fogarty. There has been some discussion of the so-called independent living bill, and some concern about the present status of this bill insofar as its wording is concerned. Do you think that there are any modifications in terminology that might be used in improving this bill?

CONGRESSMAN FOGARTY: Well, all I can say is that we do not expect any action to be taken this year; that Congress is expected, I hope, to adjourn next week, and that further hearings will be held next February, to be called by the chairman of the committee.

I would like to add something to what Senator Humphrey said a few moments ago. What made me late in getting in today is that we have just passed our appropriations bill, and we have included in it, and it will be before the Senate this afternoon, five million dollars for international health activities, in hard money, that can be used to be spent under the so-called Health for Peace bill. (Applause)

CHAIRMAN KRUSEN: I know that Surgeon General Burney and Miss Switzer were not anxious for Mr. Fogarty to come here until he had gotten this bill passed this afternoon. (Laughter)

MISS SWITZER: I might say there were a lot of good things in the bill,

but that was news even to me.

CHAIRMAN KRUSEN: I would like to ask Dr. Harlem to wind up the discussion with the final comments from an objective viewpoint, regarding the discussion this afternoon. This may be a large order, but I have great faith in his ability to sum up what has been said.

DR. HARLEM: I really believe that is an impossible order to fulfill. What I think we feel, looking upon this really enormous amount of work in your country in the field of rehabilitation, is that you have stated and we have met considerable agreement as long as you discuss principles, but the moment we get into your institutions, we get in contact with medical doctors or with the other professions who are working in rehabilitation in this country, we have a feeling that the discussion that goes on regarding the principles sort of does not penetrate into the real work you are doing from day to day, helping the disabled population in this nation.

You are certainly able to get the money for research, the money for the daily work, the money for the creation of facilities. That you are not completely satisfied with the progress is just a sign of health. Then the discussion on the principles may go on, as long as you are doing the job as well as you do. Thank you very much. (Applause)

CHAIRMAN KRUSEN: Is there any other member of the panel who has a final word he would like to give? If there is no further discussion, the meeting stands adjourned, with our sincere thanks to this wonderful group of legislators and doctors. (Applause)



1961 Survey of Constituent Society Committees on Rehabilitation Report of the Committee on Rehabilitation American Medical Association

CONSTITUENT MEDICAL SOCIETIES AND COMMITTEES DEALING WITH REHABILITATION

A listing of the constituent medical societies with the names of committees dealing with the subject of rehabilitation, as of January 31, 1961, and the name and address of each committee chairman is indicated below. If a directory of rehabilitation services and facilities is available, the name of the directory and where it may be obtained are also given.

Alabama

Medical Association of the State of Alabama

Alaska

Alaska State Medical Association
Vocational Rehabilitation Committee
Henry Wilde, M.D., Chairman
188 South Franklin Street
Juneau, Alaska

Arizona

Arizona Medical Association, Inc.
Subcommittee on Rehabilitation—
Industrial Health
Ray Fife, M.D., Chairman
Subcommittee on Rehabilitation
2620 North Third Street
Phoenix, Arizona

Arkansas

Arkansas Medical Society
Liaison Committee with Vocational
Rehabilitation
Fount Richardson, M.D., Chairman
316 West Dickson Street
Fayetteville, Arkansas

California

California Medical Association
Committee on Rehabilitation
Elizabeth Austin, M.D., Chairman
1400 North Vermont Avenue
Los Angeles 27, California

Canal Zone

Medical Association of Isthmian
Canal Zone

Colorado

Colorado State Medical Society
Committee on Rehabilitation
John S. Young, M.D., Chairman
6101 West Colfax Avenue
Lakewood, Colorado

Connecticut

Connecticut State Medical Society
Committee on Rehabilitation
John C. Allen, M.D., Chairman
Hartford Hospital
Hartford, Connecticut

Delaware

Medical Society of Delaware

District of Columbia

Medical Society of the District of Columbia
Committee on Rehabilitation and
Chronic Illness
Charles D. Shields, M.D., Chairman
Georgetown University Hospital
Washington, D.C.

Directory:

Rehabilitation Programs and Services
1718 M Street, N.W.
Washington 6, D.C.

Florida

Florida Medical Association

Georgia

Medical Association of Georgia
Committee on Physical Rehabilitation
R. L. Bennett, M.D., Chairman
Georgia Warm Springs Foundation
Warm Springs, Georgia

Hawaii

Hawaii Medical Association
Subcommittee of the Chronic Illness
and Aging Committee
Toru Nishigaya, M.D., Chairman
764 Kapahula Street
Honolulu 16, Hawaii

Idaho

Idaho State Medical Association
Rehabilitation Committee
H. L. Newcombe, M.D., Chairman
512 North 16th Street
Boise, Idaho

Illinois

Illinois State Medical Society

Indiana

Indiana State Medical Association
Commission on Public Health
Emmett B. Lamb, M.D., Chairman
250 Hume Mansur Building
Indianapolis 4, Indiana

Directory:

Directory of Rehabilitation
Services in Indiana
State Board of Health
Indianapolis 7, Indiana

Iowa

Iowa State Medical Society
Subcommittee on Rehabilitation
C. B. Larson, M.D., Chairman
Children's Hospital
Iowa City, Iowa

Kansas

Kansas Medical Society

Kentucky

Kentucky State Medical Association
Physical Medicine and Rehabilitation
Committee
Kenton D. Leatherman, M.D., Chairman
822 Heyburn Building
Louisville, Kentucky

Louisiana

Louisiana State Medical Society

Maine

Maine Medical Association

Maryland

Medical and Chirurgical Faculty of
Maryland

Directory:

Maryland Rehabilitation Services
Directory
Medical and Chirurgical Faculty
of Maryland
1211 Cathedral Street
Baltimore 1, Maryland

Massachusetts

Massachusetts Medical Society
Committee on Occupational Health

Directory:

Directory of Rehabilitation Resources
in Metropolitan Boston Rehabilitation
Council
United Community Services of
Metropolitan Boston
14 Somerset Street
Boston 8, Massachusetts

Michigan

Michigan State Medical Society
Vocational Rehabilitation Committee
S. D. Steiner, M.D., Chairman
3044 West Grand Boulevard
Detroit 2, Michigan

Minnesota

Minnesota State Medical Association
Medical Committee on Rehabilitation
E. C. Elkins, M.D., Chairman
Mayo Clinic
Rochester, Minnesota

Directory:

W. W. Keenan
Directory of Rehabilitation
Resources in Minnesota
Wilder Dispensary
279 Rice Street
St. Paul 2, Minnesota

Mississippi

Mississippi State Medical Association
Committee on Industrial Health
George D. Purvis, M.D., Chairman
514-D East Woodrow Wilson Avenue
Jackson, Mississippi

Missouri

Missouri State Medical Association
Committee on Physical Medicine and
Rehabilitation
D. Elliott O'Reilly, M.D., Chairman
950 Francis Place
Clayton 5, Missouri

Montana

Montana Medical Association
Fracture and Orthopedic Committee
Walter H. Hagen, M.D., Chairman
Post Office Box 2555
Billings, Montana

Nebraska

Nebraska State Medical Association
Rehabilitation Committee
John M. Thomas, M.D., Chairman
125 North 38th Street
Omaha 31, Nebraska

Nevada

Nevada State Medical Association
Medical Advisory Committee for the
State Division of Vocational
Rehabilitation
Richard A. Petty, M.D., Chairman
204 East Second Street
Carson City, Nevada

New Hampshire

New Hampshire Medical Society

New Jersey

Medical Society of New Jersey
Special Committee on Rehabilitation
Elmer J. Elias, M.D., Chairman
Post Office Box 904
Trenton 5, New Jersey

New Mexico

New Mexico Medical Society
Rehabilitation Committee
Charles R. Beeson, M.D., Chairman
Encino Medical Plaza, N.E.
Albuquerque, New Mexico

New York

Medical Society of the State of New York
Subcommittee on Physical Medicine and
Rehabilitation of the Council Committee
on Public Health and Education
George M. Raus, M.D., Chairman
Kingsley Road
Fayetteville, New York

North Carolina

Medical Society of the State of
North Carolina
Committee on Physical Rehabilitation
George W. Holmes, M.D., Chairman
2240 Cloverdale Avenue
Winston-Salem, North Carolina

North Dakota

North Dakota State Medical Association
Aging and Rehabilitation Committee
T. E. Peterson, M.D., Chairman
DePuy-Sorkness Clinic
Jamestown, North Dakota

Ohio

Ohio State Medical Association
(Committee authorized but as yet
not appointed)

Oklahoma

Oklahoma State Medical Society
Committee on Rehabilitation
E. D. McBride, M.D., Chairman

605 N.W. Tenth Street
Oklahoma City, Oklahoma

Oregon

Oregon State Medical Society
Committee on Rehabilitation
C. Conrad Carter, M.D., Chairman
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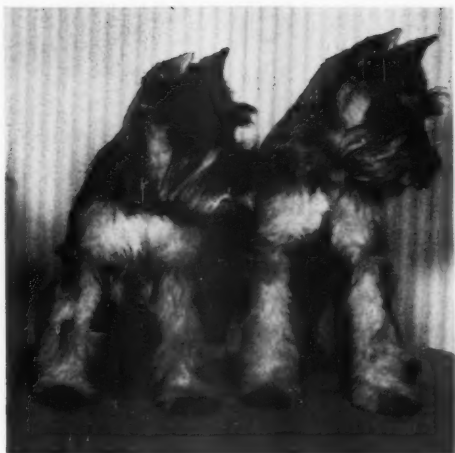
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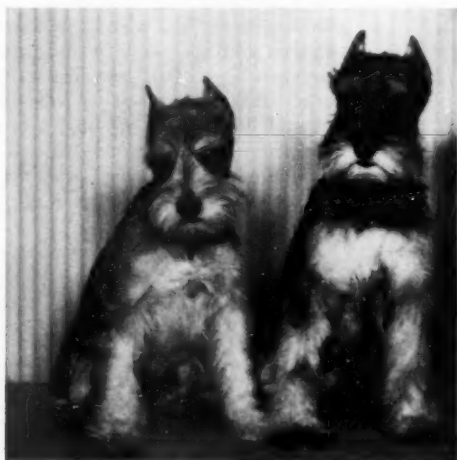
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